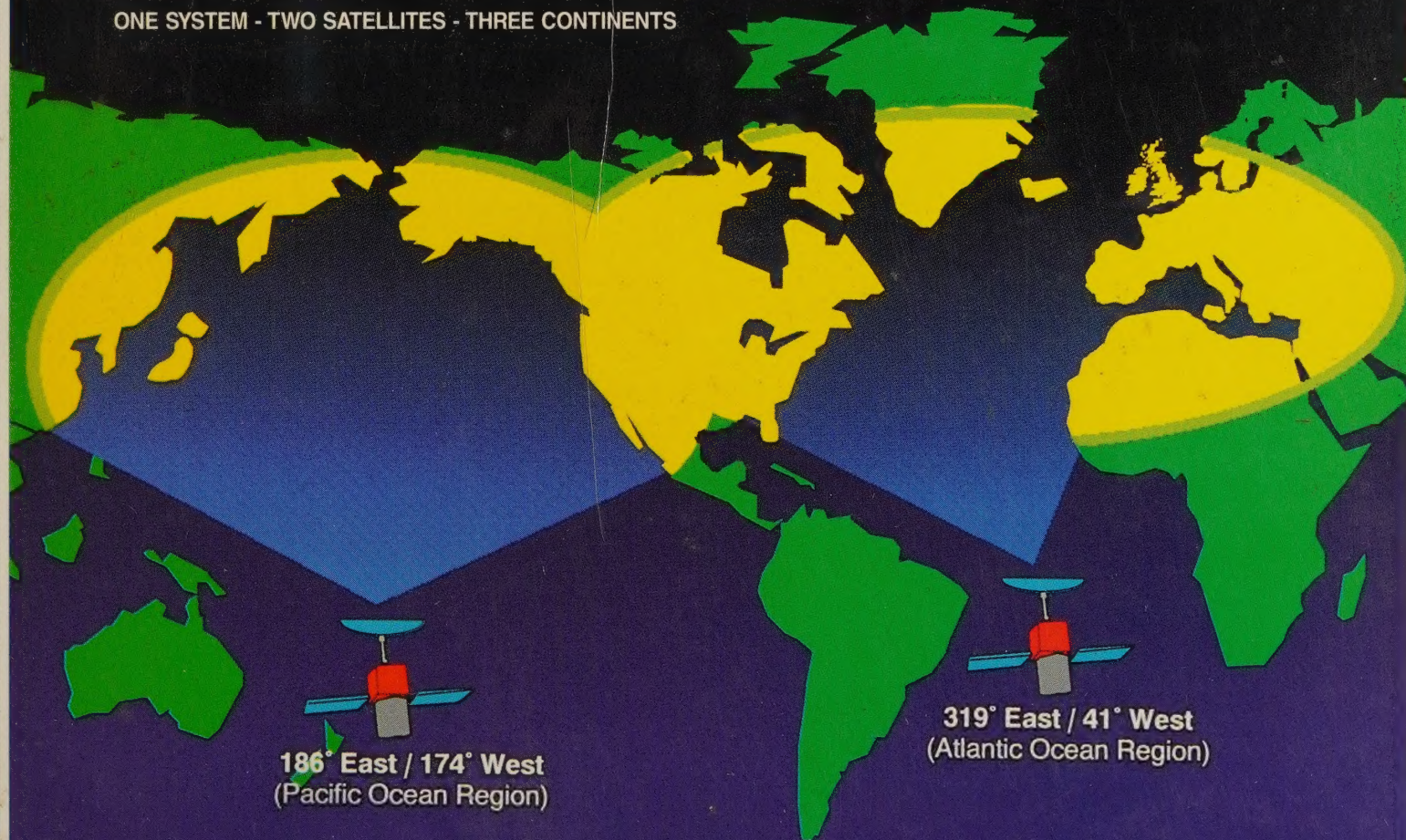

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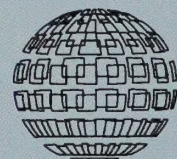
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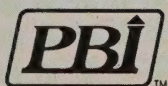
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**Asia-Pacific
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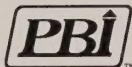
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3.62-4.2	D-9402
5.845-6.425	D-9404
6.4-7.2	D-9405-1
7.9-8.4	D-9406
8.0-8.5	D-9407
10.7-12.0	D-9408-5
10.95-11.7	D-9408
10.95-12.2	D-9408-1
10.7-11.7	D-9408-2
10.95-12.75	D-9408-3
11.7-12.2	D-9409
11.7-12.75	D-9409-1
11.46-11.96	D-9409-2
12.2-12.75	D-9410
14.0-14.5	D-9411

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Output Frequency (GHz)	125 kHz Step Size Model Number
0.95-1.45	U-9448
0.95-1.75	U-9448-1
1.5-1.8	U-9448-2
3.4-4.2	U-9451-1
3.62-4.2	U-9451
5.845-6.425	U-9453
7.9-8.4	U-9454
11.7-12.2	U-9455
12.2-12.75	U-9455-1
12.75-13.25	U-9455-2
10.95-12.75	U-9455-3
14.0-14.5	U-9456
14.0-14.5/12.75-13.35	U-9456-1
14.0-14.75	U-9456-2
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FOREWORD

Welcome to the first edition of *The Asia-Pacific Satellite Directory*. You'll find a broad spectrum of information on virtually every player in the Asia-Pacific satellite arena, including detailed profiles of satellite operators serving the Pacific Rim; transponder brokers and resellers; product manufacturers and suppliers; professional service providers such as consultants, regulatory agencies and insurance agencies; uplinking, downlinking, satellite newsgathering, and other transmission service providers; videoconferencing and technical service firms; and related organizations. Countries represented in the *Directory* include Australia, Bangladesh, Brunei, Cambodia, China, Fiji, Hong Kong, India, Indonesia, Japan, Korea (North), Korea (South), Laos, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Tonga, and Vietnam, among others.

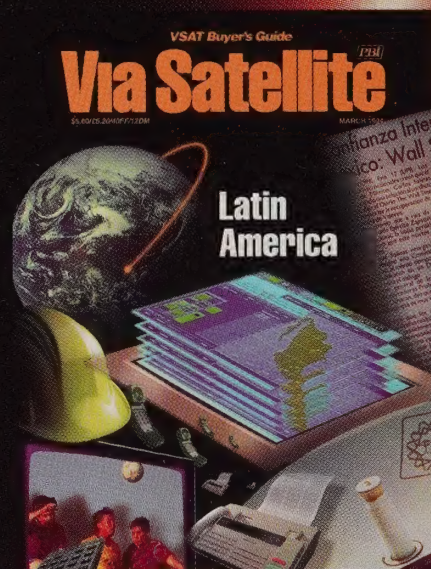
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Information in the *Directory* was furnished by the organizations listed and is believed to be accurate. Phillips Business Information, Inc. cannot accept responsibility for inaccuracies, omissions or claims made by companies listed.

Phillips Business Information, Inc. welcomes your comments about all aspects of this edition of *The Asia-Pacific Satellite Directory*. If after using the *Directory* you have any suggestions on how we could make it better, more complete and more useful, please direct your comments and suggestions to:

Lauren Fitzgerald, Editor
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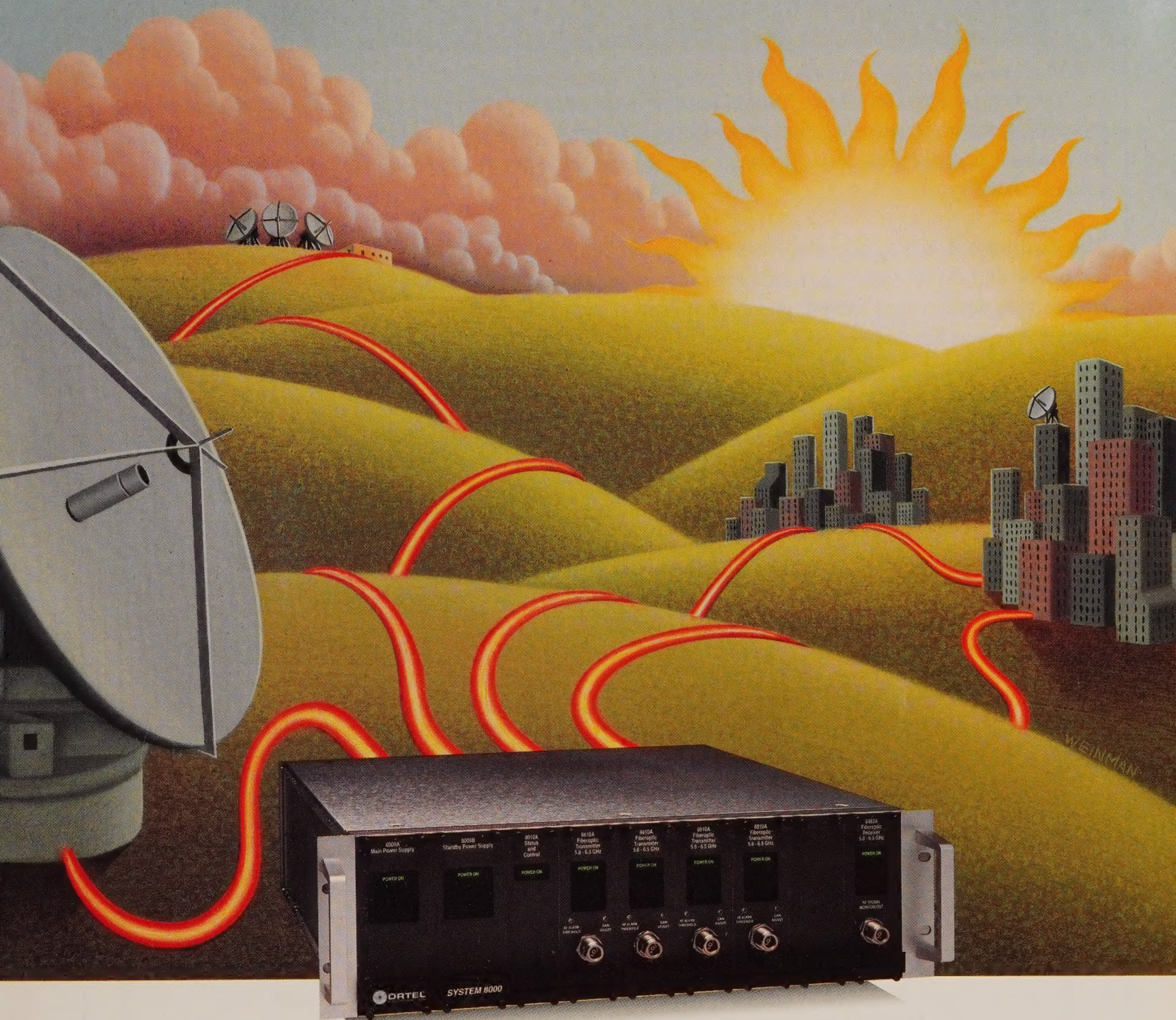
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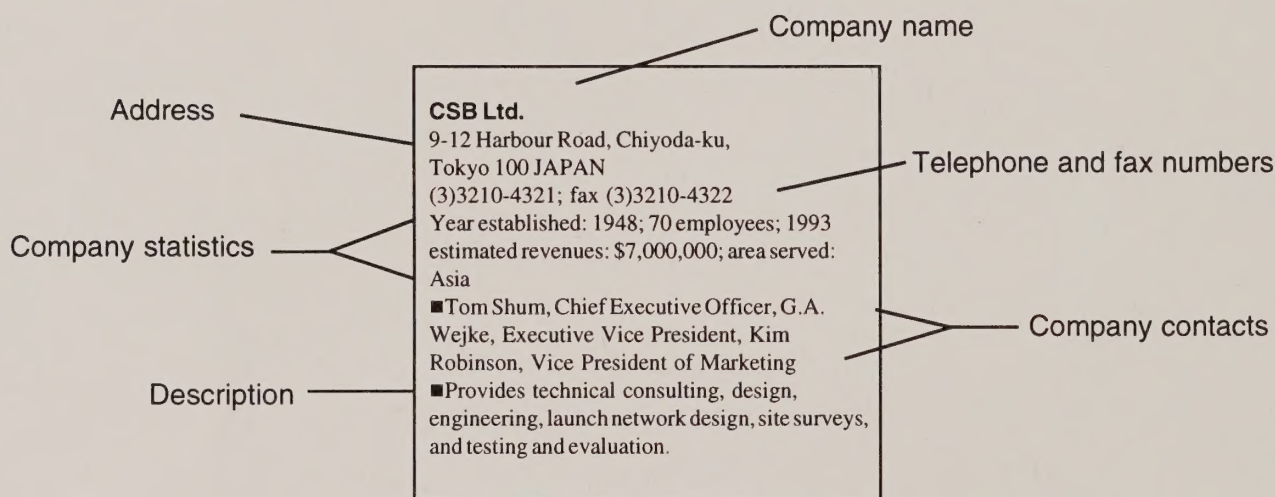
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HOW TO USE THE DIRECTORY

Each section of *The 1994 Asia-Pacific Satellite Directory* begins with an introduction that explains what information is included, how that information is presented, and how to use that section. All sections are organized to give the reader useful, easy-to-find information on every aspect of the satellite industry.

The **Equipment & Support Services** section profiles hundreds of companies and includes addresses, telephone and fax numbers, key contacts, year established, numbers of employees, estimated revenues, geographic areas served, and descriptions of services. Below is a sample of a typical Equipment & Support Services listing.



The **Satellite Operator** profiles provide easy access to information furnished by each operator. Each profile begins with information about the operator, including the operator's address, telephone and fax numbers, contact personnel, a company overview, a list of services offered, and satellite control networks. Following the operator information are *At A Glance* charts, which provide technical information on satellite systems operated by the company. Below is an example of a typical *At A Glance* chart. Profiles also contain coverage maps of operational systems.

System name

Satellite name and longitude

OPTUS A SYSTEM At A Glance

Satellite name: Optus A2 (156°E),
Optus A3 (164°E)

Spacecraft data:

Mass (in orbit): 650kg

Primary power (EOL): 860 W

Stabilization: Spin

Launch date: September 1985 (Optus 2),
September 1987 (Optus A3)

Expected lifetime: 7 years (Optus A1 and A2),
10 years (Optus A3)

Transponders:

Number: 15

Power output: 6:4 30 W TWTAs

Polarization: Dual linear

Redundancy: 13:11 12 W TWTAs

Single carrier saturation flux density: -80 to -90 dBW/sq.m.

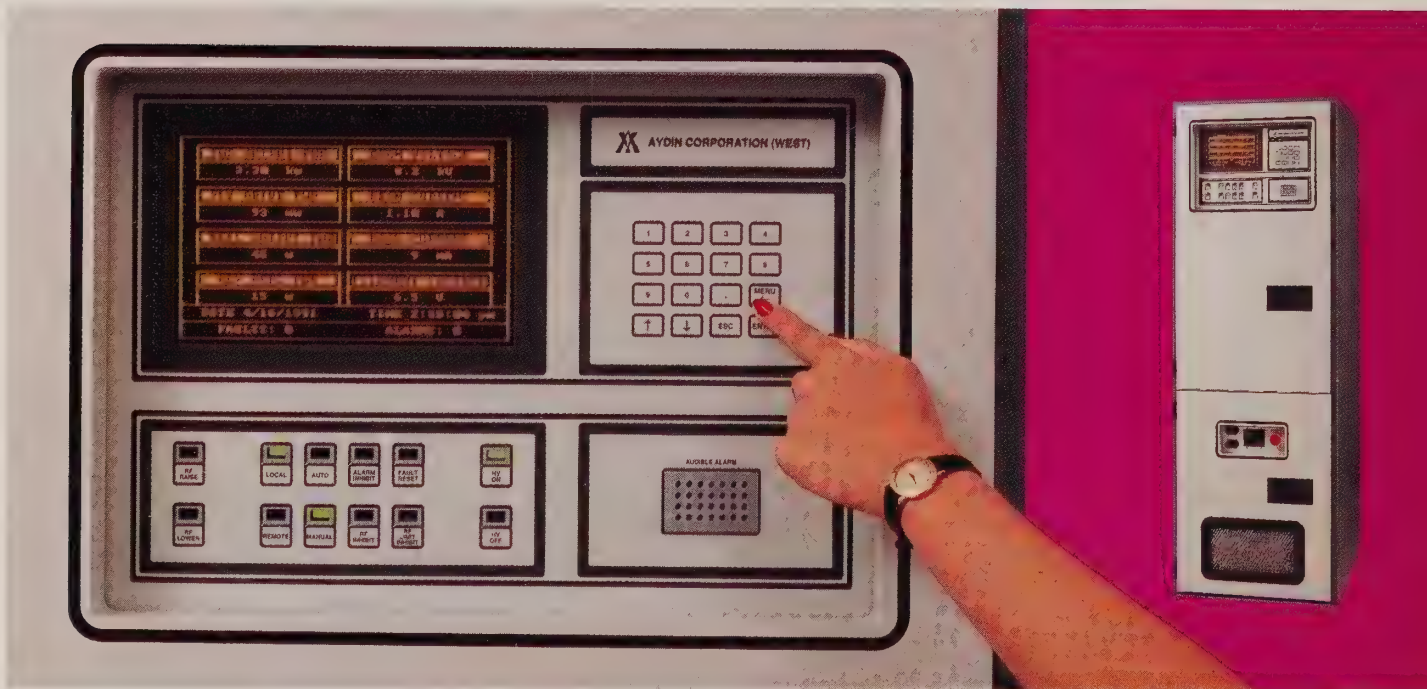
Manufacturer: Hughes

Satellite manufacturer

Satellite technical characteristics

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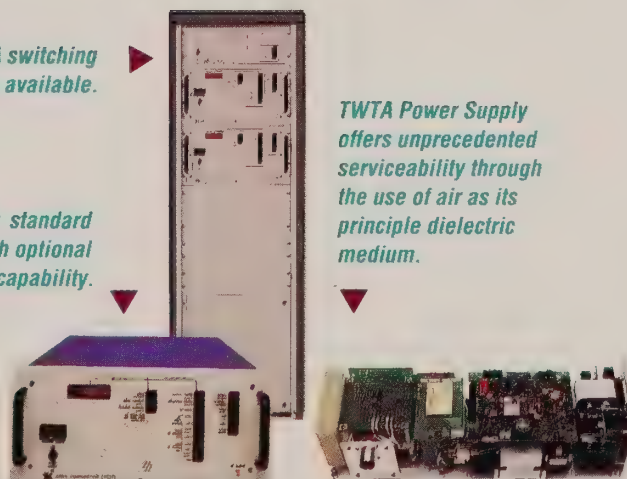
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CALENDAR OF EVENTS '94

DATE	EVENT	LOCATION	PHONE	FAX
April 18-21	NAB	Las Vegas, NV	(202)429-5300	(202)775-2146
April 18-22	Russian Telecom '94	St. Petersburg, Russia	(800)323-1088	(617)734-8562
April 25-29	Africa Telecom '94	Cairo, Egypt	+41-22-730-58-11	+41-22-730-64-44
April 27-30	Kitel '94	Kazakhstan	+44-71-286-0720	+44-71-286-0177
May 2-5	Supercomm '94	New Orleans, LA	(202)457-4935	(202)457-4939
May 5-6	Introduction to Satellite Technology	Baltimore, MD	(301)340-2100 x249	(301)424-4297
May 9-13	GPS/GIS '94	Washington, DC	(406)248-6771	(406)248-6770
May 11-13	NeoCom '94	Kiev, Ukraine	(305)670-9444	(305)670-9459
May 22-25	Cable '94	New Orleans, LA	(202)775-3550	(202)775-3692
May 28-June 5	ILA '94	Berlin, Germany	+49-228-849-07-30	+49-228-33-07-78
May 31-June 4	Expo Comm Moscow '94	TBA	(301)986-7800	(301)986-4538
May 31 - June 4	CommunicAsia '94	Singapore	(201)652-7070	(201)652-3898
May 31 - June 4	Network Asia '94	Singapore	(201)652-7070	(201)652-3898
June 5-9	Canto '94	Curacao	(305)670-9444	(305)670-9444
June 9-11	International Radio Symposium and Technical Exhibition	Montreux, Switzerland	+41 21-963-32-20	+41 21-963-88-51
June 19-22	ITCA '94	Dallas, TX	NA	(202)833-9010
June 20-24	Hydrogen '94	Cocoa Beach, FL	(407)783-0300	(407)783-2571
July 14-15	Introduction to Satellite Technology	Arlington, VA	(301)340-2100 x249	(301)424-4297
July 19-21	TelNets '94	Monterrey, Mexico	(305)670-9444	(305)670-9459

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DATE	EVENT	LOCATION	PHONE	FAX
August 4-6	SBCA Summer Show	Orlando, FL	(703)549-6990	703)549-7640
August 24-27	CosCom '94	San Jose, Costa Rica	(305)670-9444	(305)670-9459
September 7-10	NAB Radio	Los Angeles, CA	(202)429-5300	(202)775-2146
September 11-15	Airborne Remote Sensing Conference and Exhibition	Strasbourg, France	(313)994-1200	(313)994-5123
September 16-20	International Broadcasting Convention	Amsterdam, Netherlands	NA	+44-71-240-3839
September 19-21	SCUC	Washington, DC	(303)220-0600	(303)770-0253
September 22-24	ION GPS	Salt Lake City, UT	(415)725-8911	(415)725-7010
September 27-30	Taipei '94	Taipei, Taiwan	+44-71-486-1951	+44-71-413-8230
October 4-6	CaribeCom '94	San Juan, PR	(305)670-9444	(305)670-9459
October 12-14	TeleCon XIV	Anaheim, CA	(405)743-0320	(405)743-3246
October 12-14	ICP-MSC '94	Beijing, China	+86-1-6015567	+86-1-6011370
October 12-15	SMPTE Fall Exhibition	Los Angeles, CA	(914)761-1100	(914)-761-3115
October 25-28	Communications India '94	New Delhi, India	+91-11-462-2710	+91-11-463-3506
October 25-30	Expo Comm China	Beijing, China	(301)986-7800	(301)986-4538
November 30-December 2	Cable and Satellite Asia '94	Hong Kong	+44-21-705-6707	+44-1-705-4380
December 4	DBS '94: The Business Ahead	Anaheim, CA	(800)639-8896	(303)797-7201



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INTERNATIONAL CALLING GUIDE

This guide is designed to assist you in making direct calls outside the United States. If direct dialing to a foreign country is not available to you, call your operator. Otherwise, an international call can be made by dialing: 1) 011, 2) the country code, 3) the city code, and 4) the local telephone number.

Most telephone numbers in the *Directory* contain the city code and local number, so it will be necessary to attach the appropriate country code to complete a call. For example, an Australian company may have 40-70636 listed as their telephone number. The chart below shows that the country code for Australia is 61. Therefore, it would be necessary to dial (011)61 40-706363 to complete the call.

The following chart contains country names, city names and city codes (indented) as well as country codes (CC). Time differences (TD) are included to help you schedule your calls. The time differences are based on Eastern Standard Time with (A) denoting "ahead" and (B) denoting "behind".

Country City & City Code	CC	TD	Country City & City Code	CC	TD	Country City & City Code	CC	TD	Country City & City Code	CC	TD
A			G			M			S		
American Samoa	684	6B	Guam	671	15A	Macau	853	13A	Singapore	65	13A
Australia	61	15A				Malaysia	60	13A	Solomon Islands	677	16A
Melbourne ³			H			Maldives	960	10A	Sri Lanka	94	10.5A
Sydney ²			Hong Kong	852	13A	Marshall Islands	692	17A			
						Micronesia	691	16A	T		
B			I			Mongolia	976	13A	Taiwan	886	13A
Bangladesh	880	11A	India	91	10.5A	Myanmar	95	NA	Thailand	66	12A
Brunei	673	13A	Indonesia	62	12A				Tonga	676	18A
						N					
C			J			Nepal	977	10.5A	V		
Cambodia	855	12A	Japan	81	14A	New Caledonia	687	16A	Vietnam	84	12A
China	86	13A	Tokyo ³			New Zealand	64	17A			
Beijing ¹			Yokohama ⁴⁵			Niue	683	6B	W		
Christmas Island &						Norfolk island	672	6.5A	Western Samoa	685	6B
Cocos Islands	672	12A	K								
Cook Islands	682	5B	Korea	82	14A	P					
						Pakistan	92	10A			
F			L			Palau	689	14A			
Fiji	679	17A	Laos	715	NA	Papua New Guinea	675	15A			
French Polynesia	689	5B				Philippines	63	13A			

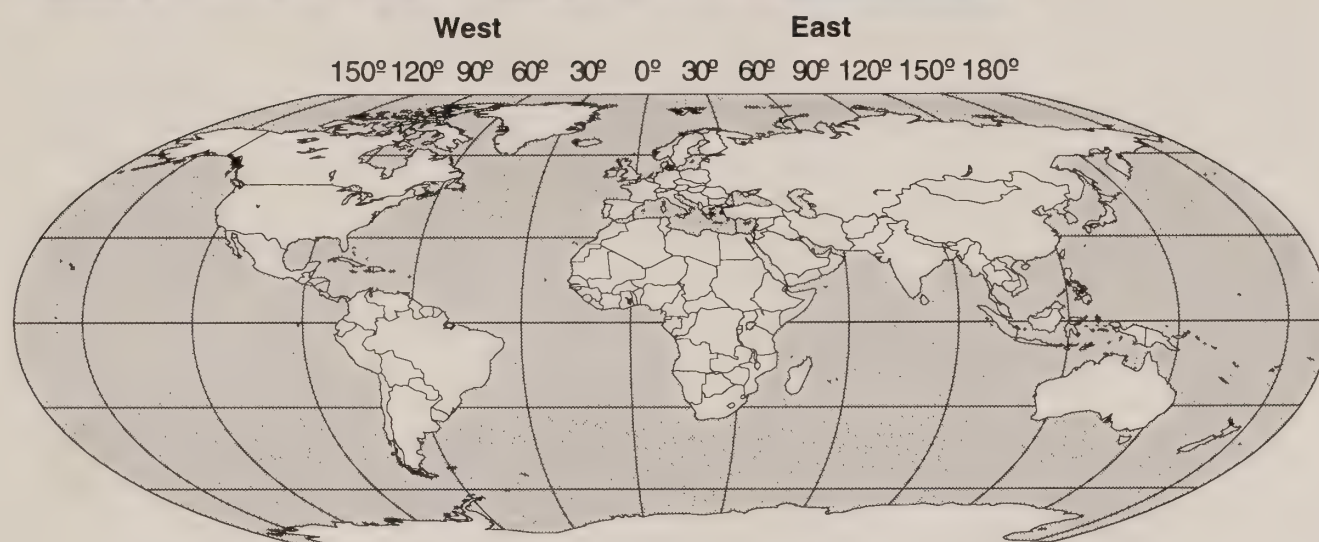
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West Longitude

Position	Satellite Name	Operator	Band(s)	Position	Satellite Name	Operator	Band(s)
0.8°	Bifrost	Norwegian Telecom	Ku	74°	Galaxy II	Hughes	C
0.8°	Thor	Norwegian Telecom	Ku	74°	SBS-2(a)	Comsat	Ku
1°	Intelsat 512	Intelsat	C; Ku	76°	Comstar D2,D4(a,b)	Comsat	C
5°	Telecom 2B (b)	France Telecom	C; Ku; X	77°	SBS-4	Hughes	Ku
8°	Telecom 2A	France Telecom	Ku; C; X	81°	Satcom K-2	GE Americom	Ku
11°	Gorizont 26/Statsionar 11	Russian PTT	C; Ku	85°	Satcom K-1	GE Americom	Ku
14°	Gorizont 15/Statsionar 4	Intersputnik	Ku	85°	Telstar 302	AT&T	C
15.5°	Inmarsat 2-F2	Inmarsat	C;L	87°	Spacenet III	GTE Spacenet	C; Ku
16°	Loutch K-2054 and K-21721	Russian PTT	Ku;L	93°	Gstar III (a)	GTE Spacenet	Ku
18°	Intelsat 515	Intelsat	C; Ku	93.5°	Galaxy III	Hughes	C
19°	TDF 1, 2 (b)	Telediffusion de France	K	95°	SBS-6	Hughes	Ku
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21.5°	Intelsat K	Intelsat	Ku	103°	Galaxy VI	Hughes	C
25°	Raduga 23/Statsionar 8	Russian PTT	C	103°	Gstar I	GTE Spacenet	Ku
27.5°	Intelsat 601	Intelsat	C; Ku	105°	Gstar IV	GTE Spacenet	Ku
31°	Hispasat 1A, 1B (b)	Hispasat SA	Ku; X	107.3°	Anik E2	Telesat Canada	C; Ku
31°	Marcopolo I (b)	B-Sky-B Ltd.	K	111.1°	Anik E1	Telesat Canada	C; Ku
37.5°	Orion F1	Orion	C	113.5°	Morelos F1	Telecomunicaciones de Mexico	C; Ku
31.4°	Intelsat 504 (a)	Intelsat	C; Ku	116.8°	Morelos F2	Telecomunicaciones de Mexico	C; Ku
41°	TDRS-4	CCC	C	123°	Telstar 303	AT&T	C
45°	PAS-1	Panamsat	C; Ku	123°	SBS-5	Hughes	Ku
50°	Intelsat 506 (a)	Intelsat	C; Ku	125°	Galaxy V	Hughes	C
53°	Intelsat 513	Intelsat	C; Ku	125°	Gstar II	GTE Spacenet	Ku
55°	Inmarsat 2-F4	Inmarsat	C; L	128°	ASC I	GTE Spacenet	C; Ku
65°	Brazilsat A-1	Embratel	C	131°	Satcom C-3	GE Americom	C
69°	Spacenet II	GTE Spacenet	C; Ku	133°	Galaxy I	Hughes	C
70°	Brazilsat A-2	Embratel	C	135°	Satcom C-4	GE Americom	C
72°	Satcom 2R	GE Americom	C	137°	Satcom C-1	GE Americom	C
72°	SBS-3	Comsat	Ku	139°	Aurora II/Satcom C-5	Alascom	C
				160°	Optus-B1	Optus Comm.	Ku
				170°	Raduga 18/Statsionar 10	Russian PTT	C
				174.3°	TDRS-5	CCC	C
				177°	Intelsat 503 (a)	Intelsat	C; Ku
				186°	Intelsat 510	Intelsat	C; Ku

East Longitude

Position	Satellite Name	Operator	Band(s)	Position	Satellite Name	Operator	Band(s)
1°	Eutelsat I-F2 (a)	Eutelsat	Ku	85°	Raduga 20, 26	Russian PTT	C
3°	Telcom 1C	France Telecom	C; Ku; X		Statsionar 3		
5°	Tele-X	Swedish Space		87.5°	ChinaSat (DFH-2A)	Ministry of P&T, China	C
7°	Eutelsat II-F4	Eutelsat	Ku	90°	Gorizont 13,21/		
10°	Eutelsat II-F2	Eutelsat	Ku		Statsionar 6	Russian PTT	C; Ku
13°	Eutelsat II-F1	Eutelsat	Ku	91.5°	Intelsat 501 (a)	Intelsat	C; Ku
13°	Eutelsat II-F6	Eutelsat	Ku	93.5°	Insat-2B	Indian Dept. of Space	C
13.2°	Italsat 1	Italian Space Agency	Ka; Ku; S	95°	Loutch K-1897	Russian PTT	Ku; L
16°	Eutelsat II-F3	Eutelsat	Ku	96.8°	Gorizont 19/	Russian PTT	C; Ku
19.2°	Astra 1A, 1B (b), 1C, 1D, 1E, 1F	SES	Ku		Statsionar 14		
21.5°	Eutelsat I-F5	Eutelsat	Ku	98°	ChinaSat (DFH-2A)	Ministry of P&T, China	C
23.5°	DFS 1 Kopernikus	Bundespost Germany	Ku; Ka	99°	Ekran 17, 18, 19, 20/	Russian PTT	
24.5°	Intelsat 605	Intelsat	C; Ku		Statsionar T		
28.5°	DFS 2 Kopernikus	Bundespost Germany	Ku; Ka	103°	STW-1	Ministry of P&T, China	C
31°	Arabsat 1C, 2A	Arabsat	C; C/S	103°	Gorizont 14, 23, 25/	Russian PTT	C; Ku
33.5°	DFS 3 Kopernikus	Bundespost Germany	Ku; Ka		Statsionar 21		
34.5°	Intelsat 603 (a)	Intelsat	C; Ku	105.5°	Asiasat 1	Asiasat Co C	
35°	Raduga 22, 28/	Russian PTT	C	108°	Palapa B2R	PT Telekomunikas	C
	Statsionar 2			110°	BS3 Yuri A, B	NASDA Japan	K
36°	Eutelsat I-F1 (a)	Eutelsat	Ku	110.5°	Chinasat (DFH-2A)	Ministry of P&T, China	C
36°	Eutelsat I-F4	Eutelsat	Ku	113°	Palapa B2P	PT Telekomunikas	C
36°	Eutelsat II-F5	Eutelsat	Ku	125°	STW-1	Ministry of P&T, China	C
40°	Gorizont 12,22/			128°	Raduga 21,27/	Russian PTT	C
	Statsionar 12	Russian PTT	C; Ku		Statsionar 15		
45°	Raduga 19,24/			132°	CS3 Sakura A	NASDA Japan	C; Ka
	Statsionar 9	Russian PTT	C	134°	Rimsat 1	Rimsat	C; Ku
49°	Raduga 1,2/			136°	CS3 Sakura B	NASDA Japan	C; Ka
	Statsionar 24	Russian PTT	C	140°	Gorizont 18/	Russian PTT	C; Ku
53°	Gorizont 17/				Statsionar 7		
	Statsionar 5	Russian PTT	C; Ku	145°	Gorizont/	Russian PTT	C; Ku
57°	Intelsat 507 (a)	Intelsat	C; Ku		Statsionar 16		
60°	Intelsat 604	Intelsat	C; Ku	150°	JCSAT 1	Japan Comm	Ku
63°	Intelsat 603	Intelsat	C; Ku	154°	JCSAT 2	Japan Comm	Ku
64.5°	Inmarsat 2-F1	Inmarsat	C; L	156°	Optus A2	Optus Comm	Ku
66°	Intelsat 505 (a)	Intelsat	C; Ku	160°	Optus A1	Optus Comm	Ku
70°	Raduga 25/			162°	Superbird B	SCC	Ku; Ka
	Statsionar 20	Russian PTT	C	164°	Optus A3	Optus Comm	Ku
74°	Insat-2A	Indian Dept. of Space	C	177°	Intelsat 511	Intelsat	C; Ku
80°	Gorizont 16, 24/	Intersputnik	C; Ku	179.5°	Inmarsat 2-F3	Inmarsat	C; L
	Statsionar 13			180°	Intelsat 508 (a)	Intelsat	C; Ku
83°	Insat 1D	Indian Dept. of Space	C; S	190°	Raduga 18/	Russian PTT	C
					Statsionar 10		

(a) inclined orbit; (b) collocated

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SECTION 1

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This section features original articles by the editors of *Via Satellite* on the status and growth of the Asia-Pacific satellite communications industry.

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SATELLITE COMMUNICATIONS OVER ASIA: THE RACE IS ON

by Timothy J. Logue

A mad race for space over Asia is underway right now that compares with the craziest mid-day, full-speed traffic pattern on the ground. Several satellites, already in orbit, have been moved to cover the Asia-Pacific area, a number of additional "used" satellites are being evaluated, and brand-new spacecraft are beginning to be launched.

Unlike transportation snarls, however, the Asian space race has no traffic cops, and existing methods for arbitrating disputes have been stretched to the limit. The situation has already led to several confrontations over choice orbital locations, and other clashes are about to occur.

The list of countries in this showdown is expanding rapidly, as is the number of companies affixing their name to plans to launch satellites over the Asian skies.

The Need for Satcoms in Asia

The high degree of interest in satellite communications for Asia is due largely to the continuing rapid growth of many Asian nations' economies and the related rise in family incomes throughout much of the region. On the other hand, telecommunications and broadcasting facilities in many countries have not been augmented at the same rate, though this is changing.

The number of basic telephone lines found in Asia-Pacific countries varies widely. Australia, Japan, Hong Kong and Singapore's service levels compare favorably with those in North America and Europe. Taiwan and the Republic of Korea are hastening to catch up. But China, Indonesia, Thai-

land, Malaysia, the Philippines and others rank far behind.

Moreover, basic telephony service barely meets the fundamental needs of many export-driven businesses in the region. Executives also want facsimile, advanced data and even business television services, so that they can communicate with customers and compete more effectively. The poor quality of many local telephone networks in some countries has created demand for VSAT services.

Television programmers like Home Box Office, Turner Broadcasting, the Australian Broadcasting Corporation and others have looked at the success of STAR TV and realized that there is a vast hunger for more TV programming throughout Asia, both entertainment and news/business oriented. Stultified by years of watching government-controlled channels and empowered by newly acquired disposable income, emerging middle classes in India, China and southeast Asia are turning their eyes to satellite-delivered shows. Entrepreneurs are busy wiring neighborhoods with cable television or setting up satellite master antennas on top of apartment buildings. The ungainly home satellite dish is becoming a more common sight as well.

Intelsat's Role in the Region

The boom in satellite communications over Asia has been a long time in coming, a fact that is easy to forget in today's frenzy. Satcoms first came to the region when the then-fledgling International Telecommunications Satellite Consortium (Intelsat) launched its second satellite in 1966 to cover the Asia-Pacific region. The first satellite, Early Bird,

provided transatlantic services. A third satellite launched over the Indian Ocean in 1969, completed the global communications network.

Ever since, Intelsat has been replacing and upgrading its system. The satellites moved to cover the Pacific, however, have often been used previously for the heavily-trafficked Atlantic and even Indian Ocean regions. Today, the organization has four satellites over the Pacific Ocean, although three are aging and not capable of maintaining precise positions in orbit. A fifth is scheduled to begin operations this month. Intelsat also has five satellites over the Indian Ocean, including one at a new operating location of 91.5°E. From this new location, Intelsat hopes to compete more effectively for intra-Asian regional traffic.

Intelsat, an international, inter-governmental organization, provides satellite capacity to its signatories, who in turn provide capacity and services to end users. The satellites are used for a variety of applications, including full-time video distribution; occasional-use video transmission; switched trunk telephony, facsimile, data and telex communications; and more sophisticated business telecommunications. Most of the organization's traffic is international—particularly transoceanic—but capacity is also leased to countries for domestic and regional use.

Over time, the Pacific Ocean region became notable for having the lowest level of usage of the Intelsat system; nevertheless, traffic growth during much of the 1980s was robust, topping 20 percent per annum in some years. Transpacific video exchanges became a major application in the early 1980s and have remained important revenue sources.

Intelsat's policy of moving older satellites that were to be replaced by new, high-capacity models from the Atlantic and Indian Ocean regions has begun to change. In 1988, Intelsat began purchasing a

series of satellites designed more specifically for the needs of the Pacific Ocean region. Two of the first three of these Intelsat 7 satellites, being built by Space Systems/Loral, are being placed over the Pacific Ocean. The first was launched successfully on an Ariane rocket in late October.

Anticipating more competition and a greater need for medium-sized satellites, Intelsat also began purchasing a new series in 1992 called Intelsat 8. The first two will serve the Asia-Pacific region, starting in 1996. In its scramble to meet short-term capacity requirements in the Asia-Pacific region created by delays in the Intelsat 7 program, Intelsat has leased a Russian-built Express satellite from Informkosmos for a period of five years, with operations scheduled to begin in June 1994.

In a move to conduct business more effectively—end users consistently complain about huge mark-ups on capacity and poor service quality from signatories—Intelsat has been lowering its barriers to competition. The treaty that binds the organization together requires separate satellite system operators to consult with Intelsat on technical and business terms before allowing the launch or use of alternative systems.

When it first contemplated licensing non-Intelsat systems in an extended policy review in 1983-85, the U.S. government was sensitive to its treaty obligations and to the foreign policy implications of irritating a large number of Intelsat members by allowing private systems to attract business away from the international satellite organization. Therefore, the U.S. government initially restricted private international satellites it was licensing to carry only non-switched traffic, such as video and private line services for large customers.

Over the last few years, however, Intelsat has lowered its guard gradually, and the U.S. Federal Communications Commission has responded by allowing private systems to carry a small amount of

switched traffic. In November 1992 Intelsat raised the number of public switched circuits separate systems were permitted to carry before it determined that the threshold for "economic harm" had been passed. Now, Intelsat allows 1,250 circuits per satellite; previously only 100 circuits per system were conceded.

Both Intelsat and the U.S. government have set a timetable to eliminate all such restrictions by 1997-98, but liberalization could come much more quickly. A special Intelsat committee began meeting in September 1993 to evaluate the restrictions and the treaty itself to see whether it meets Intelsat's needs in today's world.

In general, and especially in the Asia-Pacific region, Intelsat's satellites have been used to full capacity for some time. This is due partly to growth in the amount of traffic and also to delays in the manufacture of new satellites. Many countries provide telecommunications services through ministries of post, telephone and telegraph, which are signatories to and have an overwhelming preference for dealing with Intelsat, in which they have invested financially. Nevertheless, a shortage of capacity sometimes leaves them no choice but to use alternative satellite systems. This has given some of Intelsat's erstwhile competitors a window of opportunity.

Private International Systems

The satellite systems covering the Asia-Pacific area can be broken into three groups based on their targeted geographic markets. The first group seeks to compete directly with Intelsat by offering transpacific and even transindian ocean services. In the bargain, they also try to provide interconnection among east Asian countries, and among Australia/New Zealand and the South Pacific island nations. The second group seeks to serve mainly the Asian mainland, and the third group is launching primarily domestic satellites.

Columbia Communications/TRW: At the moment, Intelsat's only transpacific competitor is Columbia Communications Corporation. In 1990 it outbid Intelsat for the right to lease 12 transponders on a National Aeronautics and Space Administration satellite over the mid-Pacific. The satellite is one of three Tracking and Data Relay System Satellites launched by NASA primarily to relay data from scientific satellites and the space shuttles to a centralized ground station in New Mexico. However, an aborted scheme to semi-privatize the system in the 1970s left NASA with satellites over the Atlantic and Pacific carrying commercially useful transponders not needed by the space agency. This capacity was auctioned off.

Columbia, a small Honolulu/Washington, DC-based company, had difficulties meeting its financial commitments to NASA in 1992. However, by July 1993, Columbia worked out a new agreement that moved away from fixed payments to a plan involving revenue sharing.

The TDRSS satellite over the Pacific Ocean can connect western North America, including Alaska and Mexico, with a swath of Asia stretching from southeastern Siberia to Luzon, including Beijing and Hong Kong.

TRW, the manufacturer of the TDRSS satellites, gave Columbia an early boost, when it agreed in December 1991 to help sell capacity and purchased an unspecified number of transponders. TRW views the overall project with Columbia as a means to enter the satellite services arena. Later, it hopes to launch its own Pacificom satellite to provide transpacific services. The FCC gave TRW a conditional license for Pacificom in August 1993, two years after TRW filed its original application. TRW must now complete the consultation process with Intelsat before the FCC will issue a final license.

Panamsat: The next competitor to arrive on the scene, Panamsat, will be a serious challenger to both

Intelsat and Columbia. The company was founded by the mercurial Spanish-language broadcaster Rene Anselmo after he sold his broadcasting interests. Anselmo turned part of the money around and applied his considerable energy to the international satellite business. He entered the industry, moreover, with a well-developed grudge against Intelsat and its U.S. representative, Comsat, from his experiences in dealing with them as a broadcaster wanting to exchange video programs via satellite with Mexico.

Panamsat's first satellite, a reconditioned U.S. domestic spacecraft, was launched in 1988 for transatlantic services between North America, Latin America and Europe. The company fought furious political battles in order to gain access to key markets, such as Great Britain, France and Germany, and ultimately succeeded in filling the satellite.

Anselmo then laid plans to take on Intelsat around the world with a rival global system. He contracted with Hughes Space and Communications for three very sophisticated, high-capacity satellites. The first new spacecraft is set to be launched on an Ariane rocket in May, and will provide services for the Asia-Pacific region. Within a year, two more satellites will be launched, first to the Atlantic and then to the Indian Ocean regions, thus completing the first private global satellite network 26 years after Intelsat's.

Anselmo's expansion plans are now fully funded. On New Year's Eve 1992, Anselmo sold Emilio Azcarraga and his Televisa media empire of Mexico a 50 percent share of Panamsat for \$200 million, while still retaining control. Anselmo and Azcarraga had worked together in Anselmo's broadcasting days. The final step financially was a \$440 million bond offering by Panamsat that sold out in one day in July 1993. With cash in hand, Panamsat announced September 3 that it had ordered a fourth satellite from Hughes to be used as a spare.

With Anselmo and Panamsat in the game, Asia will gain a high profile owner and an organization that is not reluctant to take regulators head-on in a very public, non-Asian manner. On the other hand, Panamsat has six years of experience in gaining entry into international markets and turning opponents into at least grudging collaborators.

Sovcan Star: The next competitor could be a product of the end of the Cold War. Last year a Russian launch failure set back plans to start a provisional service by a joint Russian-Canadian venture called Sovcan Star. The group's ultimate goal is to launch, starting in 1996, as many as six satellites with Russian-built platforms and Canadian-built communications payloads.

The May 27, 1993, Proton rocket failure destroyed a Russian Gorizont satellite that Sovcan Star would have used to begin an early commercial service. The satellite would have been positioned over Papua New Guinea at 145°E, providing coverage from Alaska and Hawaii west to India and south to Australia. The use of a replacement satellite for an initial service by Sovcan Star is still being discussed.

In the meantime, the Russian partner, NPO Prikladnoi Mekhaniki (NPO-PM), a satellite builder, and four Canadian entities are proceeding with their plans to launch a jointly-built satellite network. The four Canadian companies involved include a pair of space hardware manufacturers, Spar Aerospace Ltd. and Com Dev Ltd., and a domestic communications service provider, Canadian Satellite Communications Inc.; and a trading company, General Discovery Ltd.

Failed Ventures: Other early entrants in the transpacific satellite race have had hard times. Two original recipients of conditional licenses by the FCC lost their authorizations in 1992, because of lack of progress. Temporarily, at least, Finansat and McCaw Space Technology have been forced from the list of possible future operators. McCaw had

planned to use Guam as a hub for satellites over the Indian and Pacific Oceans. Finansat had plans for satellites over the Atlantic and Pacific Oceans.

Regional and Domestic Systems

The mid-Pacific orbital locations needed for satellites seeking to connect the east and west edges of the Pacific basin are not the only ones growing crowded with new and potential claimants. Those slots best suited for coverage of mainland Asia and Australia are becoming even more congested.

Palapa: Intelsat's first challenger over the Asian skies was Indonesia's Palapa satellite system, whose first spacecraft was launched in 1976. The Indonesians launched their first satellites with the objective of providing the entire nation, which consists of thousands of islands, with basic telephone and television service. Because of the slow roll-out of ground infrastructure, however, Palapa operators found that they could not fill the system efficiently, and agreed to lease capacity to their ASEAN neighbors, Malaysia, Thailand and the Philippines.

Today, there are three Palapa satellites in orbit, operated by PT Telekom, serving the southeast Asian quarter of the continent, including UN forces in Cambodia, Papua New Guinea and Vietnam, as well as users from several other countries in the region. Palapa has also become the best existing alternative to Asiasat for video distribution, providing capacity to a variety of national and international broadcasters seeking to reach audiences in the region.

Satelindo, a new Indonesian commercial entity, was authorized to launch the third generation of spacecraft, Palapa C, which will have larger footprints. The new satellites will cover not just the ASEAN nations, but Papua New Guinea, northern and eastern Australia and New Zealand, and more of China. Satelindo is looking for potential users to invest in

the system as well. The first Palapa C is scheduled to be launched in 1995.

A Satelindo affiliate, PT Pasifik Satelit Nusantara, took possession of Palapa B1, which had reached the end of its normal operational life in late 1991. PSN rechristened the satellite Palapa Pacific 1 and moved the bird east to 134°E. There, the company hoped to provide cut-rate service from the satellite, which had run out of north-south stationkeeping fuel. The lower prices for capacity are at least partially offset, because customers need to track the satellite as it gradually moves about, adding to equipment and operational costs. PSN reportedly has the rights to take control of future Palapa B generation satellites when they are retired from service.

The move of Palapa Pacific 1 to 134°E in early 1992 set the stage for the world's first confrontation in space over possession of an orbital location. Normally, well in advance of the actual launching of a satellite, countries work through the International Telecommunication Union to coordinate the use of an orbital location and associated radio frequencies with existing and prospective satellites nearby. Satellites that plan to cover the same general geographic area usually need to be positioned two degrees away from each other (about 900 miles apart along the geostationary satellite orbital arc 22,300 miles above the equator). The chances of satellites located in the same orbital position actually colliding is fairly remote, but if they are using the same radio frequencies, they could easily interfere with each other's signals so badly that both become unusable for communications services. As a result, polite efforts among engineers to "work things out" ahead of time have been the norm.

Tongasat/Rimsat: The 134°E location had, however, been previously registered by the tiny Kingdom of Tonga on behalf of Tongasat, the brainchild of Dr. Mats Nilson, a colorful former execu-

tive of Comsat and Intelsat. In 1989, Tongasat announced plans for a constellation of several satellites over the Pacific Ocean and Asian land mass. The venture eventually made so many filings—31—that Intelsat's then-director general, Dean Burch, wrote a letter to the ITU, drawing its attention to the unusual activity. Tongasat eventually gave up all but six of the locations.

Another Tongasat activity proved to be just as controversial: It offered various entities in the region the right to use its orbital locations for remuneration. Eventually, Tongasat struck deals with two U.S.-based groups to use all six orbital locations. Two were slated for Unicom, a Colorado-based group whose principals entered the business originally as marketing agents for Columbia Communications. Unicom first attempted, in November 1990, to obtain FCC approval for the transfer of McCaw's conditional licenses, in a move to gain access to the orbital locations that had been registered for McCaw by the United States with the ITU. The FCC did not act on the license transfer request, so Unicom struck a deal with Tongasat in late 1991 for use of two of its six orbital locations.

Rights to use the other four Tongasat orbital locations were awarded to another small U.S. firm called Rimsat in November 1992. Rimsat, based in Fort Wayne, IN, working closely with Nilson, quickly struck a \$150 million deal with Russian space authorities to lease aging, in-orbit Russian Gorizont and Raduga communications satellites and move them to the Tongasat/Rimsat orbital slots. These satellites are to be replaced with newly launched Russian Express satellites, the same type favored by Intelsat.

Rimsat chose the same orbital location for its first Gorizont that had been occupied by Palapa Pacific 1. Early in the year it appeared as if the confrontation would be avoided, as the Indonesians gave some public indications that they would move when

the Gorizont arrived, while the Russians kept missing publicly announced dates for the transfer of the first satellite. In June, Rimsat's prospects improved when it was announced that Malaysian investor Tajudin Ramli would invest \$38 million in the venture. This infusion of capital was followed in July by the relocation of the first Gorizont satellite to 134°E.

The war of words between the two sides escalated rapidly from that point, with Indonesian authorities vowing to keep their satellite in place and Rimsat threatening to turn its satellite's transmitters on to drown out the old Palapa. The confrontation was finally resolved in late October, when the ITU brokered an agreement whereby the two satellites will share the orbital slot until the end of life of the Palapa satellite. The two sides also promised to pursue possible cooperative ventures for the future.

Adding fuel to the controversy surrounding Tongasat, Columbia Communications, with immediate support from Panamsat, filed a petition with the FCC in late August, arguing that the U.S. government should take the lead in opposing Tongasat's alleged abuse of ITU procedures and "trafficking" in orbital slots. It charged that the Russian satellites Rimsat proposes to use are being dumped on the international market. The filing also argued that the FCC should deny radio licenses for earth stations seeking to access any of the Tongasat locations.

Globostar: The Russians also have a direct entry in the Asian space race that is interesting from a technical standpoint. In December 1992, a private Russian company called Global Information Systems Inc. (GIS) announced plans to market services in Asia on the new Globostar satellite system. These satellites would employ advanced communications technologies previously only used on Russian military spacecraft.

One of these technologies, scanning spotbeams, permits very narrow, powerful radio beams to sweep over Asia in milliseconds. The power of the beams would allow very small earth stations to be used. Similar technologies have been discussed for western communications satellites, but have never been deployed. The new Russian satellites are to be used primarily by independent Russian banks, but excess capacity will be made available for Asian services. The first satellite is to be launched in late 1994.

GIS also announced that it had signed an agreement with The Communications & Broadcast Managers Inc., of Manila, to form a joint venture. Tim Brewer, a veteran of the early days of Asiasat, was hired as a representative.

Asiasat: Confrontations are likely to increase in frequency in the coming months as various operators seek to lock in locations for satellites already under construction. Asiasat, the company that lit the fuse on the current boom, was having difficulty finding a location for its second satellite, until it came to an agreement with Thailand.

Asiasat launched its first satellite, a rebuilt U.S. domestic model that had been retrieved from a faulty orbit by the U.S. space shuttle, in April 1990. Despite a somewhat doubtful beginning, Asiasat rapidly sold out its capacity, thanks in large part to a major commitment from HutchVision's Star TV.

Asiasat 1 was the first satellite, other than those of Intelsat, to provide broad coverage of Asia. The company was also unique in that it is a joint venture between Hutchison Whampoa and Cable & Wireless of Hong Kong, and the China International Trust and Investment Corporation of Beijing.

Asiasat's success at finding a customer interested in coverage of the whole region and the sale of additional capacity to countries ranging from Mongolia to Burma ignited the interest of many

others in the region. This phenomenon had the inadvertent effect of making it harder for Asiasat to find an orbital location for its second satellite, which will be launched late this year or in early 1995.

Apstar: Among Asiasat's stiffest competitors will be APT Satellite Co. Ltd (Apstar), a Beijing-backed commercial company based in Hong Kong. This company plans to launch the first of two satellites, called Apstar in mid-1994 to provide service throughout Asia. Initial investors in the company are Thailand's Chia Tai group and several Chinese government-owned enterprises: China Telecommunications and Broadcast Satellite Corporation, China Yuan Wang Group Co., and Every-Victory Systems Co. Ltd. The company had been at the center of various reports about deals with Star TV or other programmers, as well as rumors of merger talks with Asiasat. However, APT Satellite is proceeding with an independent, two satellite system, with a healthy mix of pre-committed, heavy-weight television programmers.

Thaicom: Thailand's Shinawatra Satellite Co. Ltd will beat Apstar and Asiasat 2 into orbit, further muddying the mix of available capacity over Asia. Its first satellite, Thaicom 1, was launched on an Ariane rocket in December 1993. A second satellite will follow several months later. Shinawatra has an eight year monopoly on the supply of satellite capacity to domestic Thai users, though it will have to pay for the transfer of existing users of other satellites to Thaicom 1. The satellite, as a result, will be close to full when put into operation.

Time will tell whether Shinawatra's investment in broader coverage of east Asia will pay off. Although primarily designated for national coverage, the satellite will cover Indochina, and carry ten C-band and two Ku-band transponders. The second spacecraft will link Europe with Indochina.

C-band is used principally by the satellites launched over the Asia-Pacific region. Intelsat employs the

Ku-band for some communications between Japan and the United States. Panamsat 2, by contrast, will use all available bandwidth in both frequency bands. Asiasat 2 will also use all of the available C-band and most of the Ku-band frequencies.

Satellite operators have been reluctant to invest in Ku-band previously because of doubts about its reliability in the tropical rainfall areas of Asia. But with demand increasing, operators in the region are being forced to look for all available spectrum.

Measat: One company that has had difficulty getting out of the starting block is Bina Rieng Ltd, a Malaysian telecommunications concern. In November 1991, the organization signed a memorandum of understanding with Hughes Space and Communications to buy two satellites estimated to cost \$250 million. The signing was witnessed by Malaysian Prime Minister Mahathir Mohamad. Despite the very public signing, however, the memorandum was never turned into a formal contract and Bina Rieng's plans to launch a Malaysian East Asia Satellite System has been slow to move forward. The project leaders may be daunted by the rapid increase in prospective competition for a share of traffic in the region and the shortage of orbital locations over southeast Asia.

Pacstar: Papua New Guinea has long had plans to launch a regional satellite system, providing coverage of key urban centers around the Pacific Rim and basic services to the Pacific island nations. The system, called Pacstar, is a joint venture between Papua New Guinea's Post and Telecommunications Corporation and a group of Washington, DC-based communications executives and investors.

The venture has had many ups and downs, however, since its public unveiling in 1985. Perhaps the highest point so far was reached in October 1990, when the government-owned International Telecommunications Development Corp. of Taiwan signed a memorandum of agreement with Pacstar.

That agreement committed the two sides to market capacity on the system, and plans were made for the actual purchase of satellites. The Taiwanese did not fulfill their commitment.

Pacstar pledged to continue on, releasing in June 1992 an Arthur D. Little study funded by the World Bank that, according to Pacstar, supported investment in its system. The study also recommended that PTC proceed with an experienced joint venture partner. As of this writing, Pacstar had not announced any joint venture partners.

Japanese Systems: Waiting in the wings of the current melee are the Japanese domestic satellite operators. There have been rumors for a long time that one or both of the two existing operators, Japan Satellite Systems Inc. (JSAT) or Space Communications Corporation, had actually launched satellites capable of switching from domestic coverage to a broader pattern, reaching out to east Asia or across the Pacific to the United States.

JSAT recently announced that it will launch a new JCSAT satellite in 1995, covering Japan and capable of reaching west to India, south to Australia and New Zealand, and east to Hawaii. SCC has said that it is studying the launch of a third Superbird satellite that might provide coverage to south Asia, as well as Japan.

Australia: Australia's Optus satellite system was designed primarily for domestic use. But from the beginning, it also provided optional coverage of Papua New Guinea and the southwest Pacific islands. Coverage of New Zealand was added later and has become entrenched with the first of the second generation Optus satellites. In the near future, however, Optus will find itself competing with a host of new satellites, the first being Panamsat, which seek to connect Australia with other parts of the Asia-Pacific region.

Korea: Koreasat planners have narrowly focused their two satellites' footprints on the Korean peninsula. Koreasat birds will carry transponders devoted to standard satellite telecommunications, as well as several that will provide high-powered television broadcasting service. The satellites are to be launched starting in 1995.

India: India is contending with the influx of satellite television, namely Star TV, that is competing with the terrestrial and satellite distribution of the national Indian television service. Last year, India began launching its second generation satellites, Insat 2, which were built indigenously.

China: China, too, has felt the need to boost in-orbit capacity, given delays in the launch of its domestic Dong Fang Hong 3 (DFH-3) system being built locally. As a result, the Chinese have purchased the aging U.S. domestic satellite, Spacenet 1 from GTE, and moved it to provide domestic communications links until new spacecraft are launched.

Others may enter the Asian space race as well. Singapore has registered for five orbital locations. Brunei and the Philippines have also discussed the possibility of launching domestic/regional satellites. Virtually any country in the region could quickly become a significant player, in short order, if its timing is good and its funding solid.

The Results Aren't in Yet

For Asian telecommunications users and television viewers, the boom in satellite capacity over Asian skies is likely to translate into the greater availability of a variety of satellite-delivered services. Competition will drive lease rates downward, spurring greater usage.

For the satellite operators, the future looks challenging. First, many still must find a place in the sky and obtain further financing to ensure the completion of satellites under construction and their launch. Then, an all out fight for market share will ensue, with the added complexity of needing to meet the diverse requirements of potential customers in the region. Eventually, some consolidation is likely, but several years will elapse before it becomes clear who will be the eventual winners of the Asian space race.

Tim Logue is a space and telecom analyst for the Washington, DC, office of the law firm Reid & Priest. The original version of this article appeared in The Asian Wall Street Journal. Reprinted from Via Satellite, January 1994.

ASIA-PACIFIC TRANSPONDERS: A SELLER'S MARKET

by Kevin Kuhns

Many unexpected changes have occurred in the Asia-Pacific satellite industry during the past year, but one issue remains the same: the regional demand for satellite transponders continues to outpace the industry's ability to deliver. The reasons for the continued transponder deficit are twofold: First, demand for more and diversified satellite services continues to grow at a steady pace throughout the region, and second, the time lag between the decision to invest in a new satellite and its commercial realization remains at about 36 months. If 1992 is designated as the year of new satellite operator "wanna-be's," there still remains at least another year ahead before the Asia-Pacific geostationary slots begin to fill up.

Asia-Pacific satellite operators can be categorized into several hierarchies of market players:

- *Flag-bearers*: Intelsat, Optus, Palapa, AsiaSat, Columbia, PSN and Rimsat. These satellite operators are currently providing services and are likely to remain as key players throughout the decade.
- *Second-wave*: Panamsat, Thaicom, APStar, Koreasat, Measat and Chinasat. These are strong contenders who have firm commitments, financial backing and are likely to be in operation in 1994 or early 1995.
- *Hopefuls*: PacStar, Unicom and Pacificom. Just behind the second wave, these are the potential operators who have not yet made a firm corporate commitment to proceed, or have yet to secure program funding.

- *Under Study*: The Philippines and Singapore are currently assessing the business potential and viability of a satellite system.

These market players can also be grouped based on the type of service—national, regional and transpacific—that they are offering or plan to provide. As of today, approximately 500 C-band and 175 Ku-band transponders are forecast through to the end of the decade. Dramatic growth is slated for the Asia-Pacific region during the mid-'90s. This growth does not, in fact, plateau toward the end of this decade as the numbers would seem to indicate, rather, there is simply no data available for additional or new satellites which may be launched toward the year 2000.

It is significant to note that the primary impetus for regional satellite service has always been broadcast television, and this particular market continues to grow at an astonishing rate. In Indonesia alone no less than seven new private television networks have been launched in the past three years, all vying for Indonesia's 150 million viewers via satellite. A similar phenomenon has occurred in Hong Kong, and new private television networks are appearing in Malaysia, Singapore and Thailand.

However, in the past year the business emphasis has begun to move to voice and data services, both public and private. This general shift of market focus is likely to dominate throughout the Asia-Pacific region for the next five to ten years. To be certain, the nations of the Asia-Pacific as a whole do not enjoy a developed, reliable terrestrial network, so many of the conventional terrestrial-based services are migrating to satellite by default. Add

to this the high cost of telecommunications to end-users, and a large pent-up demand for more and better services spells "opportunity" for the satellite industry.

New Kids on the Block

In direct response to the emerging opportunities in the region a number of new satellite operators have staked their claim to a share of the market. Reflecting the diversity of the Asia-Pacific region itself, each of these new operators is unique in business strategy, target market and ownership. But in other, less tangible attributes the new satellite entrepreneurs of the Asia-Pacific have much in common: expert knowledge of their target market, unflappable investors in a region where capital is in short supply, and a resolute commitment to succeed in a relatively untested market. The next few years will prove the viability of these ventures while demonstrating the accuracy of the many optimistic market assessments that persist to date.

Below are brief snapshots of five of the newest players in the Asia-Pacific satellite business, which are representative of the typical business entities that will prevail.

Panamsat: By April 1995, Panamsat, an aggressive, entrepreneurial company based in Greenwich, CT, will become the first private operator of a global communications satellite system. Panamsat, which already operates a full satellite over the Atlantic Ocean, has purchased four new HS 601 satellites currently under construction at Hughes Space and Communications. The second satellite, scheduled to be launched in May 1994, will be placed over the Pacific Ocean to meet the region's growing demand. Sixteen C-band transponders will provide coverage from the west coast of the United States throughout Asia, and 16 Ku-band transponders will concentrate high-power in China, Australia/New Zealand and northeast Asia. Within a year, two more satellites will be launched, first to the

Atlantic and then to the Indian Ocean regions, completing the PAS system.

Thaicom: Thaicom 1 and 2 were originally scheduled for late 1993 and late 1994 launches, respectively, but Thaicom 2 has now been moved forward to follow the first launch by just a few months. The first was scheduled to be launched on an Ariane rocket in December, as we went to press. Both satellites will be owned and operated by Thailand's Shinawatra Satellite Company Ltd.

The Thaicom satellites will be one of the Asia-Pacific's first systems to employ high-power Ku-band spotbeams in a tropical region. One of these beams centers on north-central Cambodia providing coverage for Cambodia, Laos, much of Vietnam and Thailand. For the past five years the Thai private business sector has been very active throughout Indochina, with Shinawatra now acting as a virtual monopoly operator of Laos's telecommunications. The planned Thaicom coverage will undoubtedly constitute a solid strategic advantage for Shinawatra toward becoming the primary satellite service provider for the Indochina peninsula, as these nations actively enter the sphere of the Asia-Pacific economic dynamo.

Measat: The Measat venture will be launched by a consortium headed by Binariang Sdn. Bhd. Binariang has its roots in Communications Satellite Services Sdn. Bhd. [CSS] which was established primarily to provide live B-MAC video coverage of horse racing for Malaysia's lucrative off-track betting centers. From this modest start Binariang has emerged in the past year as a major mover among the nation's new breed of deregulated, privatized telcos. Today Binariang holds a license for international gateway services (an Intelsat Standard A station is under construction), Malaysia's first mobile GSM system and, of course, the operation of the Measat system. While little information has been released regarding the Measat planned footprints of satellites, primary coverage will likely be for peninsular Malaysia, Sabah, Sarawak and

the Philippines, with regional coverage for ASEAN and southern China.

APStar: On the surface it would appear that the APStar investors, including the government of China, saw a very good thing in AsiaSat and simply decided to move into the business. However, there are other forces at work that do not readily meet the eye. For example, Rupert Murdoch's July 1993 purchase of a controlling interest in HutchVision, the operator of STAR TV, has caused speculation that the popular STAR TV transmissions (via AsiaSat) will be scrambled for subscription service only, and that Murdoch control may ameliorate the regional programming flavor to "improve" the programming standard.

The APStar venture got its jump-start from Hong Kong's TVB International, and will be controlled by Sir Run Run Shaw, the grandfather of Hong Kong's movie industry. TVBI, together with TBS, HBO Pacific, ESPN Asia and Discovery, booked the first nine transponders on APStar 1. The TVB team will focus on Chinese (Mandarin, Cantonese) programming and will target its programs to the huge mainland Chinese audience.

Rimsat: What could possibly be more incongruous than an American entrepreneurial firm, Russian satellites, Tonga-claimed IFRB satellite positions and Malaysian finance and operations? In a word, nothing; this unlikely mix of business interests is unique to Rimsat. In September 1993, TRI of Malaysia put up the capital to lease and relocate a Russian Gorizont satellite from a parking orbit to 134°E over the Asia-Pacific. At only a few million dollars, this satellite's six C-band transponders with 18-24 months of remaining service life was a real bargain and an ideal business entry for this fledgling venture. Successive spacecraft for the firm's four orbital slots will mostly be Russian Express satellites with 24 C-band transponders of considerably improved EIRP.

TRI is the parent organization of Malaysia's Celcom Sdn. Bhd., which is primarily a mobile ETACS operator with an international gateway and satellite operations license similar to Binariang. TRI has extensive business interests in Cambodia, and the Rimsat venture will play a role in developing this business. Apart from this, the Rimsat service offering will be in a strong position to offer highly competitive lease rates in a young marketplace where competitive pricing will eventually come to bear on the many new contenders.

The Yin-Yang of Asia's Satellite Business

According to Chinese cosmology, all that exists in nature consists of just two primary and inseparable attributes: the Yin, that which is feminine, dark or cold and, the Yang, that which is masculine, light or heat. Perhaps it is this philosophy of duality in all things that emboldens Asian business executives to resolutely invest where outsiders fear to tread.

Consider, for example, the recent proliferation of private satellite ventures throughout the Asia-Pacific region. A sensible venture capitalist's assessment of the achievable results would reveal several salient points:

- Despite the high level of economic growth that the Asia-Pacific region has experienced as a whole during the last five years, typical per capita GDP remains far below figures for the west. Who is going to pay for all of these planned transponder lease contracts?
- The majority of the Fortune 500 companies are in North America, and it is these that are the major users of satellite services for private network applications. There is little comparable industry demand in the Asia-Pacific.

- The regional implementation of satellite-based networks faces formidable regulatory (cross-border) and coordination challenges. It would appear that these issues alone will preclude any near-term rapid growth in satellite services, with the possible exception of television.
- Regional distribution of terrestrial PSTN service falls far short of that in North America. In the United States, telephone density approaches roughly one person per phone while throughout the Asia-Pacific it can run into the hundreds of people per phone. Where will the demand for modern satellite service come from when even the most basic telephone service is not yet available?

These points present an untenable risk-management scenario with very vague prospects for any return on investment or long-term venture profit. With this financial assessment it is not likely that any potential investor would be willing to pursue the business further. And it is here that many of the outside ventures stumble. For regional business executives, though, this is only one side of the scenario: the dark, foreboding business risk, or the Yin.

For each untenable business risk there is an opposite and immensely alluring business opportunity. Consider again the issue of PSTN distribution. There is no doubt that few, if any, of the regional nations that suffer woeful PSTN distribution will ever be able to accomplish a terrestrial network like that of North America. That would require the time (100 years) and vast economic resources that have given rise to the present-day North American telephone network.

The solution that is being borne out across the Asia-Pacific is a simple leap-frog technology approach. A step ahead of major copper-based network expansion programs, cellular operations have risen to help bridge the broad gulf in PSTN supply and demand. In Vietnam (three operators), Laos (two

operators), Cambodia (four operators), Indonesia (five operators), India (eight operators) and even reclusive Myanmar (one operator), cellular systems have sprung up. And in most cases the optimal medium for gateway service and trunk breaker circuits is satellite. It should therefore come as no surprise that cellular licenses are held by Binariang (Measat), TRI (Rimsat), Hutchison (AsiaSat), and Shinawatra (Thaicom).

While there are no Kmart or GM-sized private network opportunities to be had in the Asia-Pacific, the response to VSAT services has been overwhelming. VSAT operators in Indonesia, Thailand and the Philippines have enjoyed steady growth in their networks, despite the relatively high lease rates and recent entry of new operators. The business community has come to recognize satellite service as an expedient solution to unavailable terrestrial connections. Many of the original VSAT data-only service providers are now developing both voice and value-added services in a variety of formats. Nationwide paging networks utilizing VSAT-based backhaul trunks have been established in the Philippines, Indonesia and Thailand, and there is speculation as to the application of this technique for PCN-based systems in remote areas. This last concept would truly comprise a complete satellite/wireless bypass solution for conventional terrestrial PSTN service.

While these satellite solutions cannot, with present technology, offer the economy of a developed terrestrial network, in most instances they remain the only game in town. And it is in the fulfillment of the public clamoring for telephone and data services that Asian satellite operators see the bright opportunities, or the Yang.

It remains to be seen whether this initial union of satellite and wireless services will be a lasting affair, or simply a marriage of convenience until such time as alternate terrestrial solutions can meet the surging demand. It would be quite reasonable to

assume that if the continued development of satellite/wireless solutions are effective and, eventually, economical, then developing nations would be hard pressed to justify the necessary massive capital outlay for expansion of equivalent terrestrial-based services.

Looking Ahead — The Next Five Years

While the Asia-Pacific region has been in the limelight of the global satellite business for the past few years, it cannot be denied that this particular marketplace has been languishing. With only Palapa (currently full), Intelsat (POR full) and AsiaSat (currently full), there simply has not been any way for the market to move without additional transponder capacity for the region.

The sudden sharp peak in satellite transponder demand occurred in 1988-89 when the effects of widespread telecommunications deregulation and privatization began to be felt. As new telcos and service providers enter the fray each year, the capacity deficit becomes ever more urgent. This predicament will change abruptly in 1994 with the addition of over a hundred transponders to the regional pool. And another 150 transponders in 1995 should achieve a temporary supply-demand equilibrium.

When equilibrium is attained, market forces must come into play in the regional industry unlike anything that has occurred in the past. In much the same way that the new capacity will drive satellite service deployment in 1994, in later years it will be

incumbent upon satellite operators to offer marketable end-user services in order to fill up their transponders. Development of a generic satellite/wireless drop-in telecommunications package is at least one vehicle for sustained market growth as a PSTN bypass solution. Earth station re-marketers that offer shared-use stations can help to reduce end-user service tariffs and thereby address a much broader market base.

Innovative use of satellite services for value-added networks can open up completely new market segments for the satellite industry. These may include dedicated leased circuits for data, and consolidating dial-up access and data broadcast applications via satellite bearer circuits employing data compression that can be price-competitive with terrestrial lines.

The message from the Asia-Pacific satellite marketplace is that satellite operators and end-user service providers will not be able to live separate, independent lives. The future of the industry will depend heavily upon innovation and quick response to market demands, and to tailoring service, hardware and business focuses to the specific and often unique requirements of the region. Expert knowledge of the market direction, service trends and end-user tariff tolerance will be the essential elements for sustained business in the Asia-Pacific region for years to come.

Kevin Kuhns is a consultant specializing in telecommunications solutions for developing countries. He is based in Jakarta. Reprinted from Via Satellite, January 1994.

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SECTION 2

OPERATIONAL SATELLITE SYSTEMS

Included in This Section:

This section contains existing and follow-on domestic commercial communications satellite systems serving the Asia-Pacific region. Operators included in this section are:

1. Optus Communications Pty. Ltd.	18
2. Ministry of Posts and Telecommunications (China)	23
3. Indian Department of Space	28
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8. Ministry for Postal Services and Telecommunications (Russia)	50
9. Shinawatra Satellite Company Ltd.	56

How to Use This Section:

Profiles are organized alphabetically by country, then by operator name.

OPTUS

COMMUNICATIONS PTY. LTD.

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(G.P.O.) Box 1512
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AUSTRALIA

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Facsimile: 2-238-7100
Telex: 26921 AUSSAT

Booking Contacts:

Mark Harwood, Sales Manager, Media and Communications

Public Relations Contact:

David Foster, Corporate and Public Affairs Manager

Overview:

Operates the Optus satellite system. Provides DBS (high quality TV relay) between major cities and data, voice, video, and telecommunications within Australia, its off-shore regions and the Southwest Pacific, including New Zealand.

Services Offered:

- Fixed and broadcast services: DBS, data transmission, DBS television and radio, facsimile, telephone, and telex services
- Homestead and Community Broadcasting Satellite Service (HACBSS): uses the B-MAC television standard and can deliver one video program, six 15 kHz sound channels, a 9.6 Kbps data stream, and auxiliary services such as telex. Can be received by small earth stations with 1.5-meter antennas

Satellite Control Network:

Satellite control:	Belrose, Sydney, NSW Lockridge, Perth (backup)
TT&C stations:	Belrose, Sydney, NSW Lockridge, Perth (backup)

OPTUS A SYSTEM At A Glance

Satellite name: Optus A2 (156°E),
Optus A3 (164°E)

Spacecraft data:

Mass (in orbit): 650 kg

Primary power (EOL): 860 W

Stabilization: Spin

Launch date: September 1985 (Optus A2), ~~1992~~
September 1987 (Optus A3) ~~1997~~

Expected lifetime: 7 years (Optus A1 and A2),
10 years (Optus A3)

Transponders:

Number: 15

Power output: 6:4 30 W TWTAs

Polarization: Dual linear

Redundancy: 13:11 12 W TWTAs

Single carrier saturation flux density: -80 to -90 dBW/sq.m.

Manufacturer: Hughes

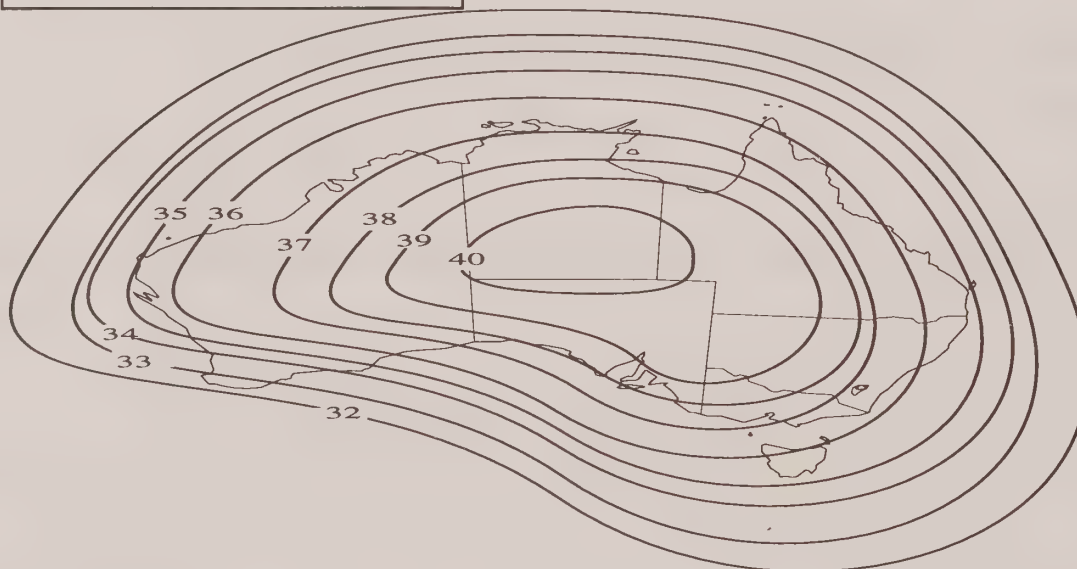
Optus A2 and A3

Orbital location:	164°E (A2), 156°E (A3)
Launch:	November 1985 (A2), September 1987 (A3)
Expected lifetime:	7 years (A2), 10 years (A3)
Expected end of life:	1992 (A2, still operational), 1997 (A3)

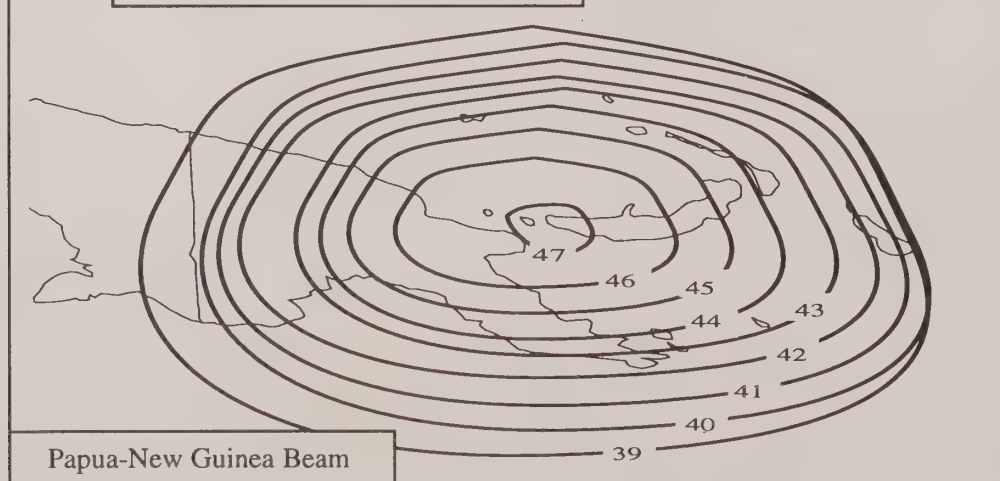
Antennas beam coverage overview:

Ku-band:	Australia, Papua-New Guinea, Southwest Pacific
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Optus A EIRP (dBW)



Optus A EIRP (dBW)



OPTUS B SYSTEM At A Glance

Satellite name: Optus B1 (160°W)

Spacecraft data:

Mass (in orbit): 1,650 kg

Primary power (EOL): 3,000 W

Stabilization: 3-axis

Launch date: August 1992 — 2005

Expected lifetime: 13 years

Transponders:

Number: 15

Power output: 150 W SSPA (L-band),
50 W TWTA (Ku-band)Polarization: RHCP (L-band),
Dual linear (Ku-band)

Single carrier saturation flux density: -71 to -98 dBW/sq.m.

Manufacturer: Hughes

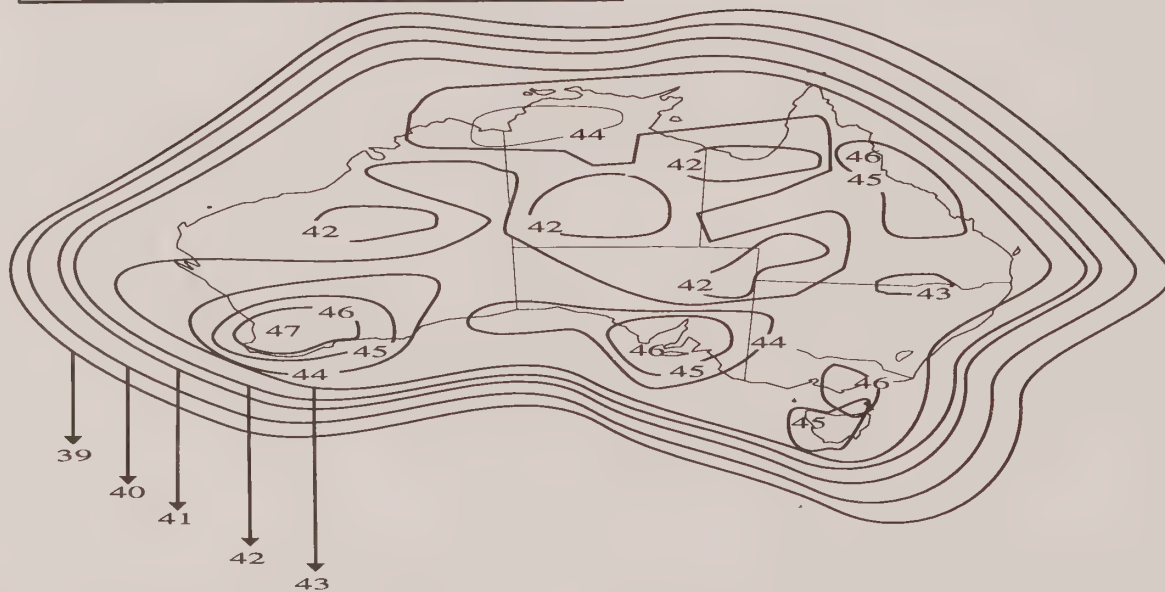
Optus B1

Orbital location: 160°W
 Launch: August 1992, Long March 2E
 Expected lifetime: 13 years
 Expected end of life: 2005

Antennas beam coverage overview:

Ku-band, L-band: Australia, New Zealand

Optus B National Beam EIRP



MINISTRY OF POSTS AND TELECOMMUNICATIONS (CHINA)

13 West Chanan Avenue
Beijing 100804
CHINA

Telephone: 1-6011250
Facsimile: 1-6011250
Telex: 222185

Booking Contact:

Zhang Ligui, Director General of Telecommunications

Public Relations Contact:

Zhao Xintong, Director, Department of External Affairs

Overview:

Operates DFH satellite systems, including STW-1, STW-2 and ChinaSat satellites. At press time, these satellites were not available for commercial use.

Services Offered:

- Six color television channels
- Telex, fax, telephone, and telemetry

Satellite Control Network:

Satellite control:	Xian
TT&C stations:	Xian

DFH-2 SYSTEM At A Glance

Satellite name: STW-1 (125°E), STW-2 (103°E)

Spacecraft data:

Mass (in orbit): 420 kg

Stabilization: Spin

Launch date: April 1984 (STW-1),
February 1986 (STW-2)

Expected lifetime: 4 years (still operational)

Transponders:

Number: 2

Power output: 8 W TWTA

Uplink frequency: 5.925-6.425 GHz

Downlink frequency: 3.700-4.200 GHz

Polarization: Circular (STW-1), linear (STW-2)

Bandwidth: 49 MHz

EIRP: 23.4 dBW (STW-1),
34.5 dBW (STW-2)

Antenna beam: Global (STW-1), zone (STW-2)

CHINASAT (DFH-2A) SYSTEM At A Glance

Satellite name: ChinaSat (DFH-2A)
(87.5°E, 98°E, 110.5°E)

Spacecraft data:

Mass (in orbit): 1,024 kg

Stabilization: Spin

Launch date: March 1988, December 1988,
February 1990

Expected lifetime: 7 years

Transponders:

Number: 4

Power output: 10 W

Uplink frequency: 5.925-6.425 GHz

Downlink frequency: 3.700-4.200 GHz

Polarization: Linear

Bandwidth: 50 MHz

Antenna beam: Zone

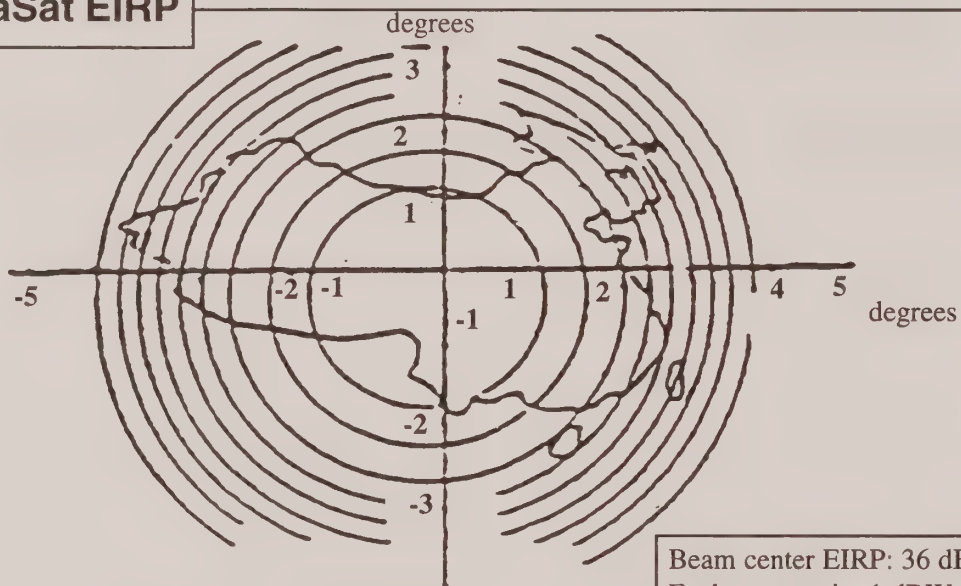
ChinaSat-1

Orbital location: 87.5°E; 98°E; 110.5°E
 Launch: March 1988; December 1988; February 1990
 Expected lifetime: 7 years
 Expected end of life: 1995, 1995, 1996

Antennas beam coverage overview:

C-band, zone beam: China

ChinaSat EIRP



DFH-3 SYSTEM At A Glance

Satellite name: DFH-3 (87.5°E, 125°E, 110.5°E)*

Spacecraft data:

Mass (in orbit): 1,155 kg

Stabilization: 3-axis

Launch date: 1994

Expected lifetime: 8 years

Transponders:

Number and power output: 18 @ 8 W SSPA, 6 @ 16 W TWTA

EIRP: 34.5 dBW (8 W SSPA),
37.4 dBW (16 W TWTA)

* To be launched

INDIAN DEPARTMENT OF SPACE

Antariksh Bhavan
New BEL Road
Bangalore 560094
INDIA

Telephone: 9180-334474
Telex: 0845-2499 or
0845-2326

Booking Contact:

Dr. S. V. Kibe, Deputy Director, Insat Programme Office

Overview:

The Indian National Satellite System (Insat) is a multi-purpose, multi-agency operational system for domestic long-distance telecommunications, meteorological earth observation and data relay, and nationwide direct satellite television broadcasting.

Services Offered:

- Continuous synoptic meteorological earth observation in visible and infrared bands
- Data collection from automatic unattended data collection platforms (DCPs)
- Direct satellite television broadcasting to community TV receivers, TV and radio programming distribution for national and regional networks
- Long-distance telecommunications services (data, facsimile and voice)
- Selectively addressable cyclone disaster warning service (DWS)
- Standard time and frequency signals (STFS) dissemination

Satellite Control Network:

Satellite control: Hassan, Karnataka

TT&C stations: Hassan, Karnataka

INSAT-1 SYSTEM At A Glance

Satellite name: Insat-1D (83°E)

Spacecraft data:

Mass (in orbit): 650 kg

Primary power (EOL): 975 W (summer solstice),
1090 W (autumn equinox)

Eclipse protection: All transponders

Stabilization: 3-axis

Launch date: June 1990

Expected lifetime: 7 years

Transponders:

Number: 12 telecommunications,
2 TV broadcast

Power output: 4.5 W TWTA (telecommunications),
50 W TWTA (TV broadcast)

Polarization: Linear

Single carrier saturation flux density: -92 dBW/M² to -70 dBW/M²
Gain settable over 22 dB range
(telecommunications), AGC (S-band)

Manufacturer: Ford Aerospace

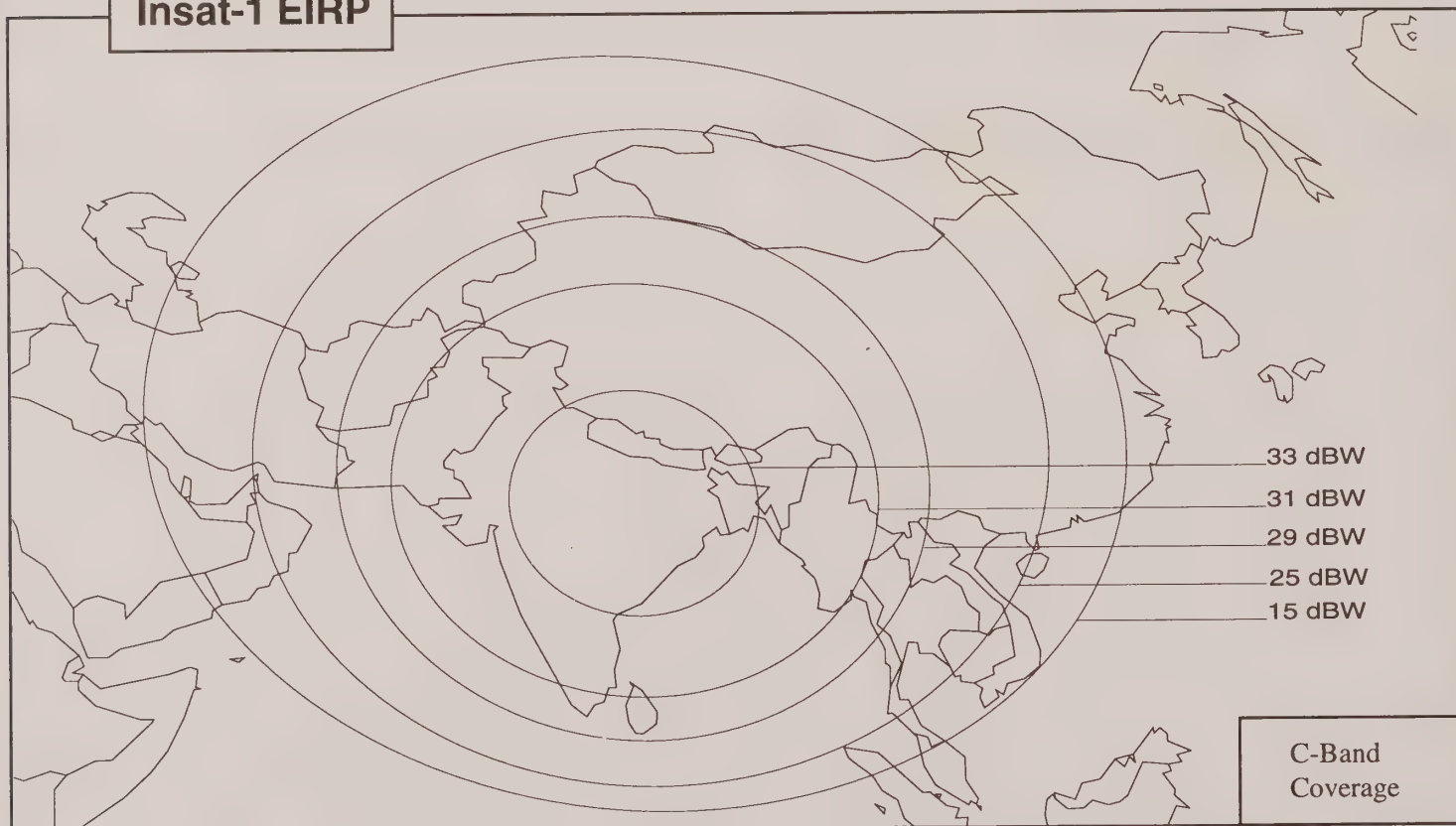
Insat-1D

Orbital location: 83°E
 Launch: June 1990, Delta
 Expected lifetime: 7 years
 Expected end of life: 1997

Antennas beam coverage overview:

C-band, S-band: Indian subcontinent

Insat-1 EIRP



INSAT-2 SYSTEM At A Glance

Satellite name:	Insat-2A (74°E); Insat-2B* (93.5°E); Insat-2C*; Insat-2D*; Insat-2E*
Spacecraft data:	
Mass (in orbit):	905 kg
Primary power (EOL):	1024 W
Eclipse protection:	All transponders
Stabilization:	3-axis
Launch date:	July 1992 (Insat-2A), 1993 (Insat-2B)
Expected lifetime:	9 years
Transponders:	
Number:	18 (12 in conventional C-band, <u>6 in extended upper C-band</u>)
Power output:	1,024 W
Polarization:	LHCP
Satellite receive G/T:	-5dB/°K
Single carrier saturation flux density:	-92 dBW/m ² to -70 dBW/m ² (C, extended-C and S-band) Gain settable over 22dB range (C, extended-C band) Gain settable over 12dB range (S-band)
Manufacturer:	Indian Space Research Organization

* To be launched

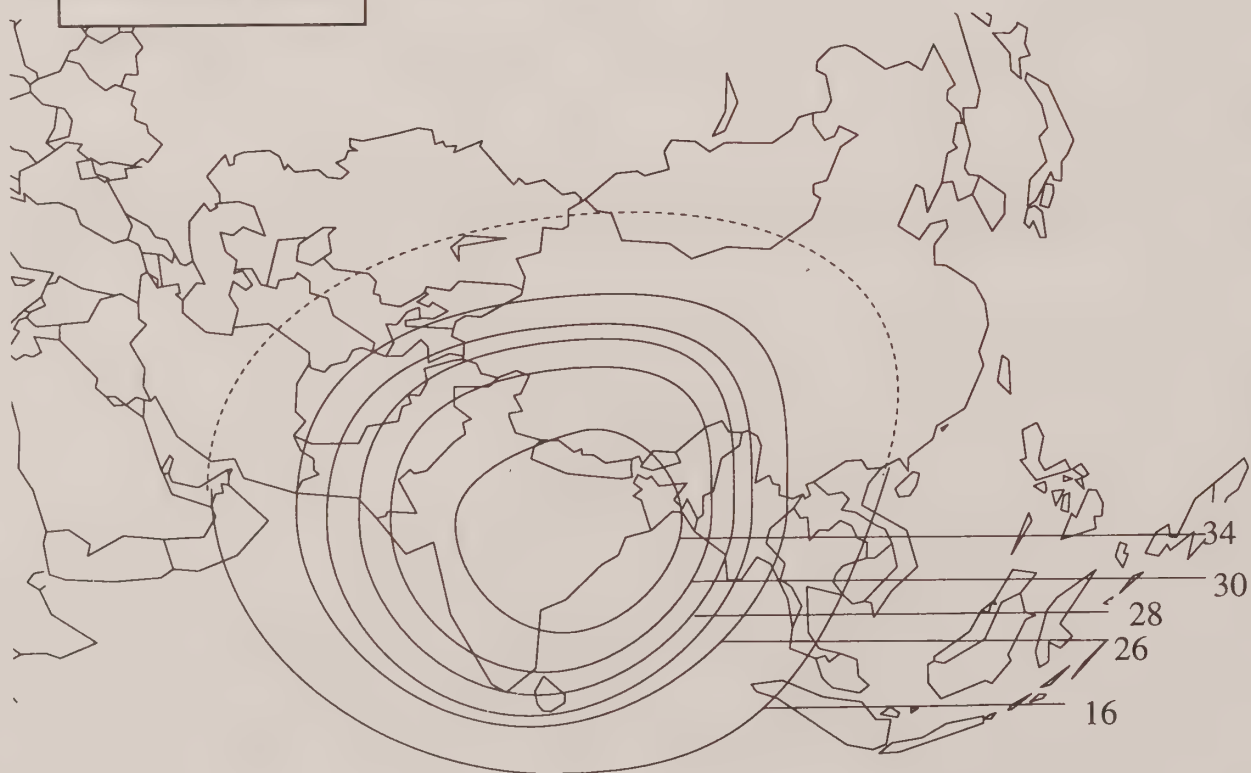
Insat-2A

Orbital position:	74°E
Launch:	July 1992, Ariane
Expected lifetime:	9 years
Expected end of life:	2001

Antennas beam coverage overview:

C-band:	Indian subcontinent
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Insat-2A EIRP



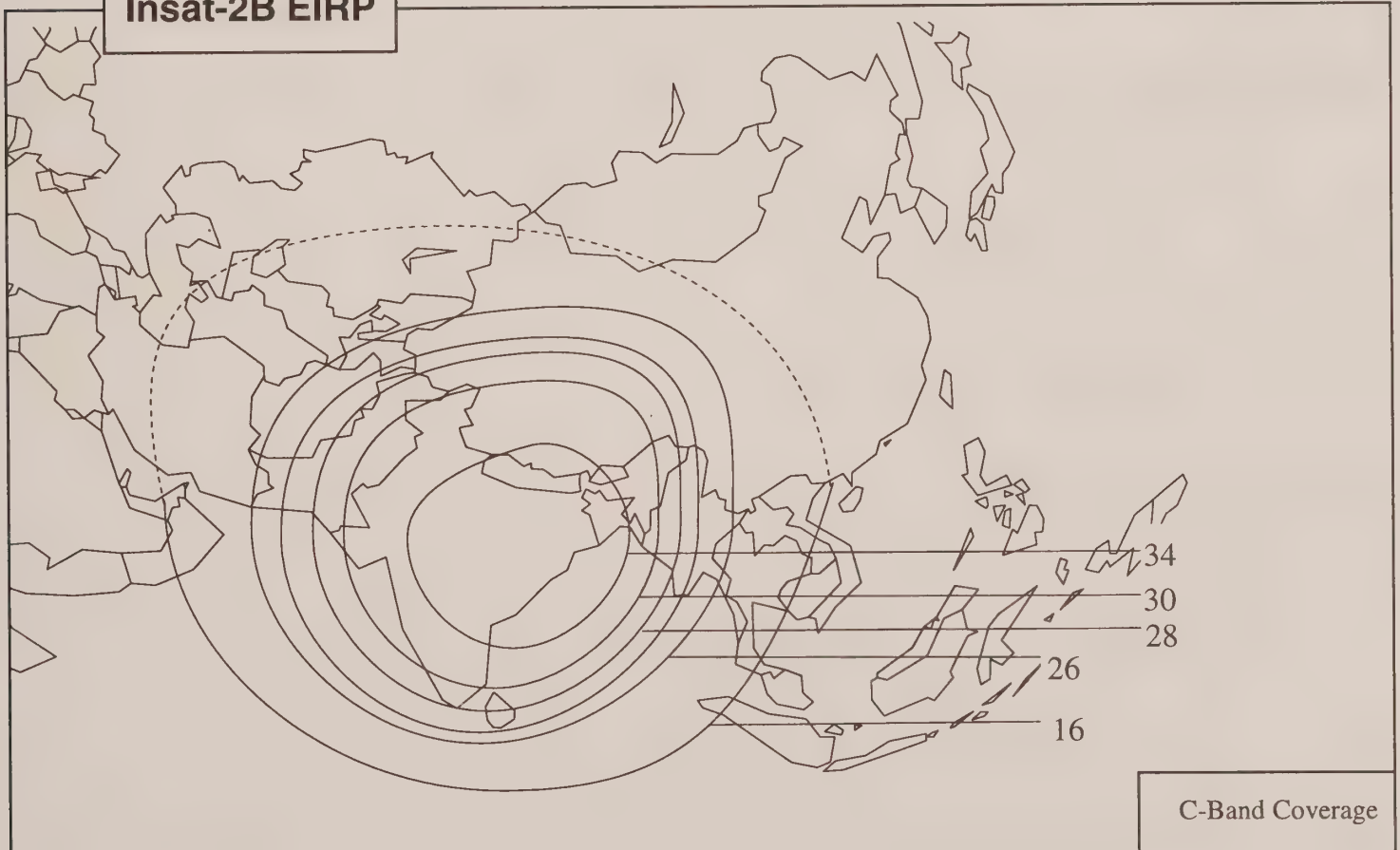
C-Band Coverage

Insat-2B

Orbital position: 93.5°E
Launch: July 1993, Ariane
Expected lifetime: 10 years
Expected end of life: 2003

Antennas beam coverage overview:

C-band: Indian subcontinent

Insat-2B EIRP

P.T. SATELIT PALAPA INDONESIA

Mulia Center
Suite 1201
Jl.H.R. Rasuna Said Kav. X6, No. 8
Jakarta 12940
INDONESIA

Telephone: 21-522-9322
Facsimile: 21-522-9320

Contact:

Sahala Silalahi

Overview:

Operates the Palapa domestic satellite system. Provides domestic telephony, TV and data communications.

Services Offered:

- Public telephony
- Data communications
- Television
- Circuits and transponder leasing

Satellite Control Network:

Satellite control: Cibinong, near Jakarta

TT&C stations: Cibinong, near Jakarta

PALAPA SYSTEM At A Glance

Satellite name: Palapa B2P (113°E),
Palapa B2R (108.1°E)

Spacecraft data:

Mass (in orbit): 628 kg

Primary power (EOL): 831 W

Stabilization: Spin

Launch date: March 1987 (Palapa B2P),
April 1990 (Palapa B2R)

Expected lifetime: 8 years

Transponders:

Number: 24

Power output: 10 W TWTA

Uplink frequency: 6 GHz

Downlink frequency: 4 GHz

Polarization: Linear

Redundancy: 6 backups

Bandwidth: 36 MHz

Single carrier saturation flux density: -89.5 dBW/sq.m.

Manufacturer: Hughes

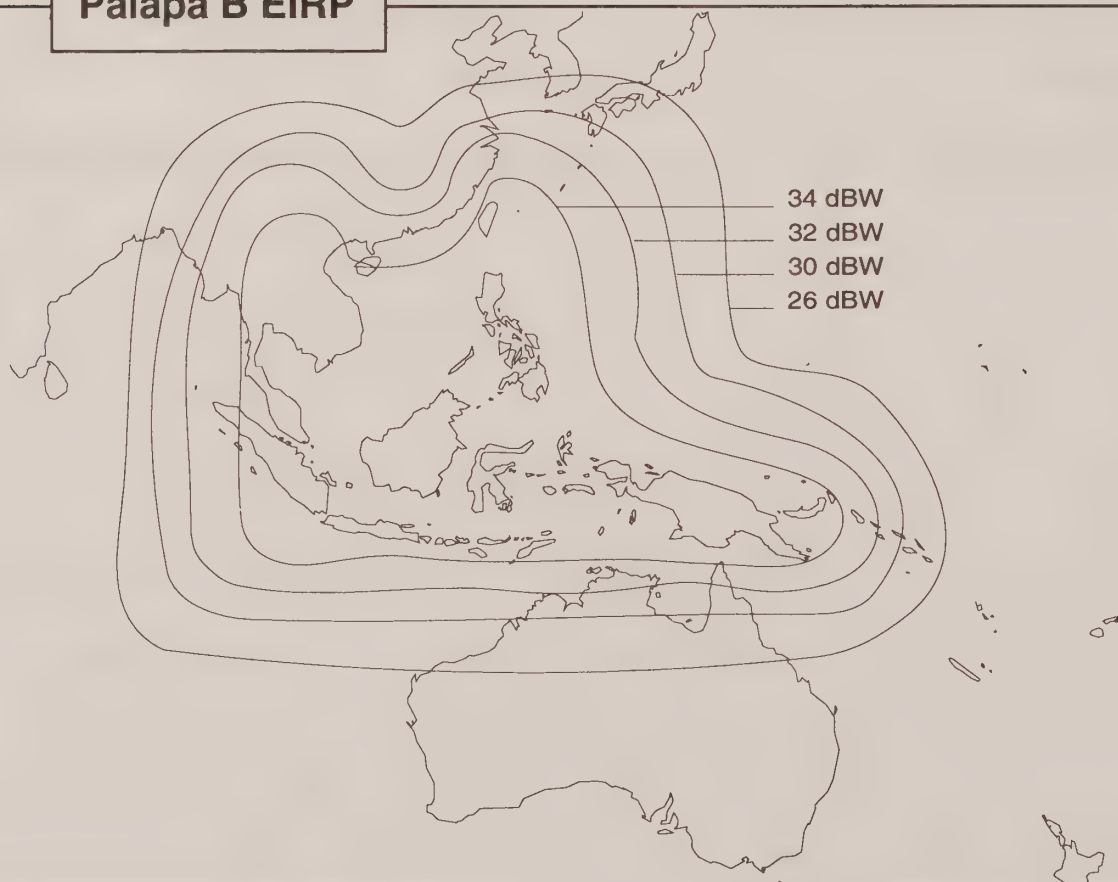
Palapa B2P, B2R

Orbital location:	113°E (B2P), 108.1°E (B2R)
Launch:	March 1987, Delta (B2P); April 1990, Delta (B2R)
Expected lifetime:	8 years
Expected end of life:	1995 (B2P), 1998 (B2R)

Antennas beam coverage overview:

C-band:	Indonesia's archipelago, ASEAN countries, Papua-New Guinea, North Australia
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Palapa B EIRP



JAPAN SATELLITE SYSTEMS INC. ---

(JSAT)

Shiroyama JT Mori Building, 27F
4-3-1 Toranomom
Minato-ku, Tokyo 105
JAPAN

Telephone: 33-5400-3700
Facsimile: 33-3437-6620

Booking Contact:

Koichi Matsumot, Manager of Corporate Communications Staff

Overview:

Operates the JCSAT satellite system, providing communications services to the Japanese industry. On August 17, 1993, Japan Communications Satellite Company Inc. (JCSAT) merged with Satellite Japan Corporation, creating Japan Satellite Systems Inc. (JSAT). The JCSAT satellite system names remain unchanged.

Services Offered:

- Data transmission and broadcast
- Video program distribution to CATV and network TV stations
- Telephony
- Videoconferencing, remote printing, high-speed facsimile transmission, satellite newsgathering

Satellite Control Network:

Satellite control: Yokohama

TT&C stations: Yokohama; Gunma Prefecture (backup)

JCSAT SYSTEM At A Glance

Satellite name: JCSAT-1 (150°E); JCSAT-2 (154°E);
JCSAT-3* (128°E)

Spacecraft data:

Mass (in orbit): 1,376 kg

Primary power (EOL): 2,200 W

Stabilization: JCSAT-1 and 2: spin;
JCSAT-3: body-stabilized

Launch date: March 1989 (JCSAT-1);
January 1990 (JCSAT-2);
August 1995 (JCSAT-3)

Expected lifetime: 10 years

Transponders:

Number: 32 (JCSAT-1 and 2)
28 Ku-band, 12 C-band (JCSAT-3)

Power output: JCSAT-1 and 2: 20 W TWTA
JCSAT-3: 60 W Ku-band, 34 W C-band

Polarization: Linear

Redundancy: 5:4

Single carrier saturation flux density: -90 dBW/sq.m.

Manufacturer: Hughes

* To be launched

JCSAT-1 and 2

Orbital position:	150°E (JCSAT-1), 154°E (JCSAT-2)
Launch:	March 1989, Ariane-4 (JCSAT-1); January 1990, Titan III (JCSAT-2)
Expected lifetime:	10 years
Expected end of life:	1999 (JCSAT-1), 2000 (JCSAT-2)

Antennas beam coverage overview:

Ku-band:	Japan
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JCSAT EIRP (dBW)

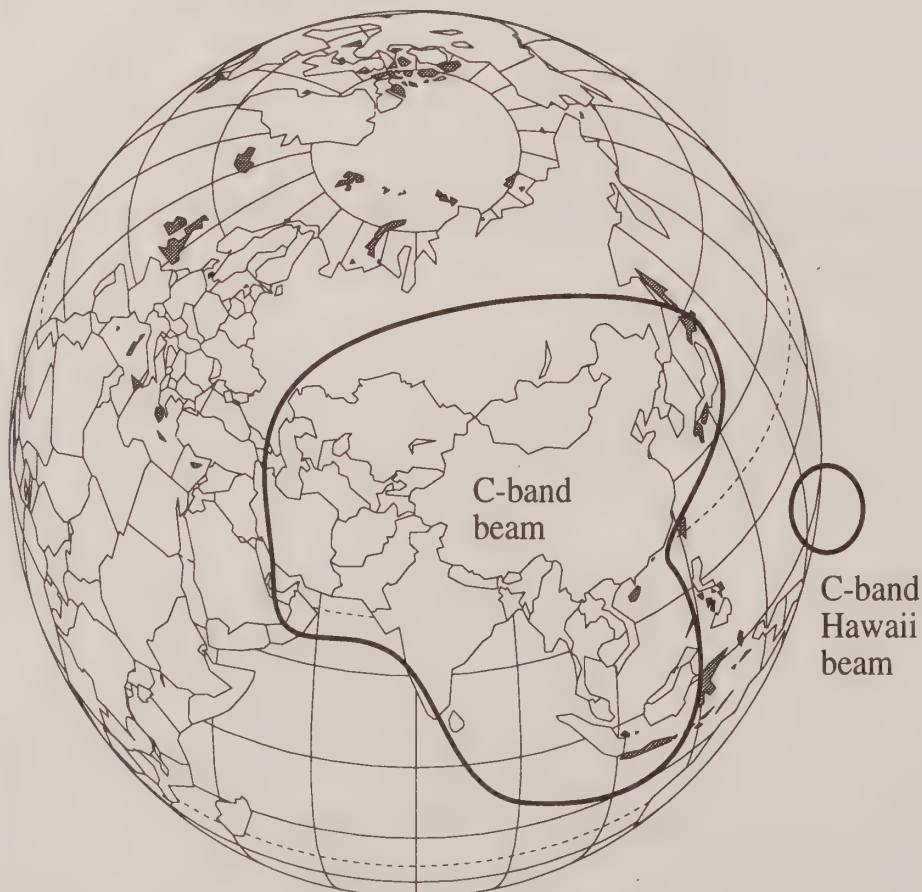
JCSAT-3

Orbital position:	128°E
Launch:	August 1995
Expected lifetime:	12 years
Expected end of life:	2007

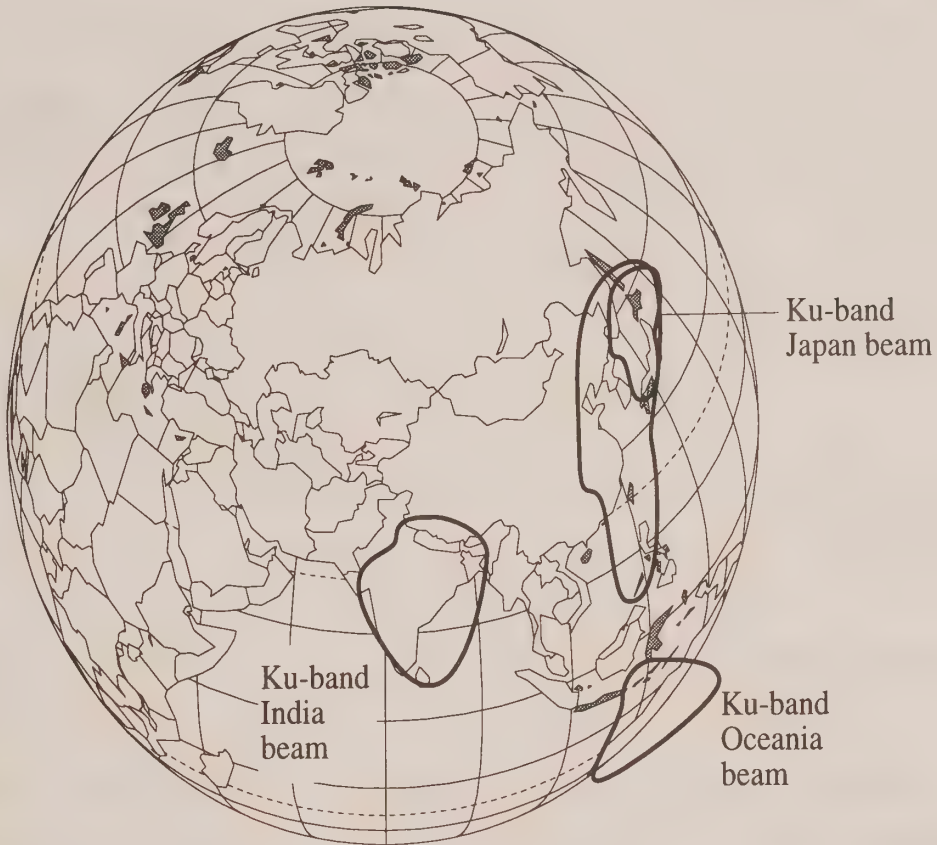
Antennas beam coverage overview:

Ku-band:	Japan (main islands), Asia, India, Australia
C-band:	Asia, Hawaii

JCSAT-3 C-Band Coverage



JCSAT-3 Ku-Band Coverage



SPACE COMMUNICATIONS CORPORATION (SCC)

Fukoku Seimei Building
2-2-2 Uchisaiwai-cho
Chiyoda-ku, Tokyo 100
JAPAN

Telephone: 3-3503-3170
Facsimile: 3-3503-3197

Booking Contact:

Shigetaro Toyoda, Director and General Manager of Marketing and Sales

Overview:

Operates the Spacebird satellite system.

Services Offered:

- Satellite news gathering (SNG)
- CATV program distribution
- TV program and PCM music program broadcasting
- Transponder resale

SUPERBIRD SYSTEM At A Glance

Satellite name:	Superbird A (158°E), Superbird B (162°E)
Spacecraft data:	
Mass (in orbit):	1,550 kg
Primary power (EOL):	3,800 W
Eclipse protection:	All transponders
Stabilization:	3-axis
Launch date:	December 1992 (Superbird A), February 1992 (Superbird B)
Expected lifetime:	10 years
Transponders:	
Number:	29
Power output:	50 W TWTA (Ku-band); 29 W TWTA (Ka-band)
Polarization:	Linear (Ku-band), Circular (Ka-band)
Redundancy:	4:2 (Ku-band), 2:1 (Ka-band)
Manufacturer:	Space Systems/Loral

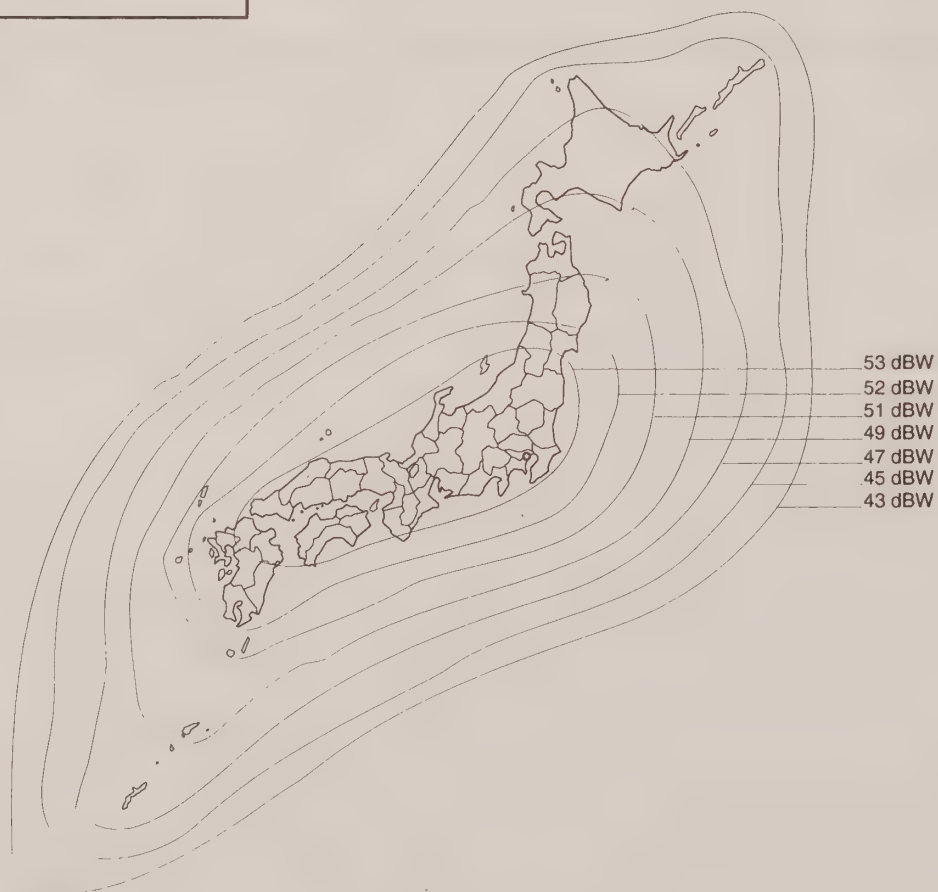
Superbird B

Orbital location: 162°E
Launch: February 1992, Ariane
Expected lifetime: 10 years
Expected end of life: 2002

Antennas beam coverage overview:

Ku-band, Ka-band: Japan; Tokyo spot beam

Superbird B EIRP



TELECOMMUNICATIONS ADVANCEMENT ORGANIZATION OF JAPAN (TAO)

31-19, Shiba 2-chome, Minato-ku
Tokyo 105
JAPAN

Telephone: 3-3769-6811
Fax: 3-3452-7600

Booking Contact:

Ikuo Izutsu, Director, General Affairs Division

Overview:

TAO (formerly Telecommunications Satellite Corporation of Japan) is responsible for the operation and control of the BS (Yuri) and CS (Sakura) series satellites, which NASDA develops and launches.

Services Offered:

- CS3 satellite: Domestic public and private communications and temporary communications over entire Japanese archipelago, including outlying islands such as Okinawa and Ogasawara.
- BS3 satellite: Direct broadcast satellite service over entire Japanese archipelago, including outlying islands such as Okinawa and Ogasawara.
- Advanced research and development in the field of communications and broadcasting technology.

Satellite Control Network:

Satellite control: Kimitsu, Chiba, Japan

TT&C stations: Kimitsu, Chiba, Japan

BS3 YURI SYSTEM At A Glance

Satellite name: BS3 Yuri-A,
BS3 Yuri-B (110°E, collocated)

Spacecraft data:

Mass (in orbit): 550 kg

Primary power (EOL): 1,500 W

Stabilization: 3-axis

Launch date: August 1990 (BS3 Yuri-A),
August 1991 (BS3 Yuri-B)

Expected lifetime: 7 years

Transponders:

Number: 3

Power output: 120 W TWTA

Polarization: 3-axis

EIRP: 55.5 dBW (Japanese mainland)

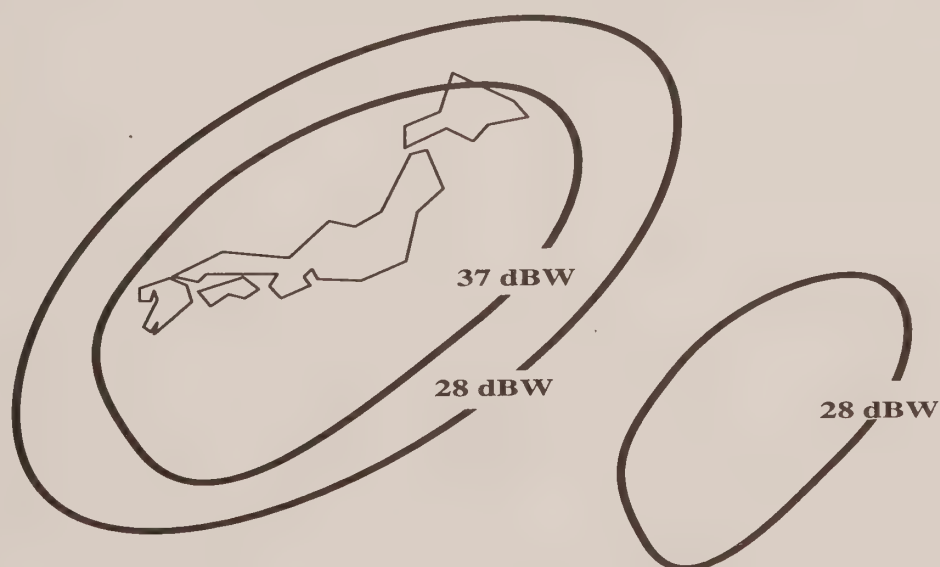
Manufacturer: NASDA

BS3

Orbital location: 110°E (BS3 Yuri-A and BS3 Yuri-B)
Launch: August 1990, NASDA N-II (BS3 Yuri-A);
August 1991, NASDA N-II (BS3 Yuri-B)
Expected lifetime: 7 years
Expected end of life: 1997 (BS3 Yuri-A), 1998 (BS3 Yuri-B)

Antennas beam coverage overview:

Ku-band: Japanese mainland

BS3 EIRP

CS3 SAKURA SYSTEM At A Glance

Satellite name: CS3 Sakura-A (132°E),
 CS3 Sakura-B (136°E)

Spacecraft data:

Mass (in orbit): 550 kg

Primary power (EOL): 745 W

Stabilization: Spin

Launch date: February 1988 (CS3 Sakura-A),
 September 1988 (CS3 Sakura-B)

Expected lifetime: 7 years

Transponders:

Number: 2 C-band, 10 Ka-band

Uplink frequency: 5.925-6.425 GHz (C-band),
 27.5-29.25 GHz (Ka-band)

Downlink frequency: 3.7-4.2 GHz (C-band),
 17.7-19.45 GHz (Ka-band)

Polarization: Circular

Bandwidth: 180 MHz (C-band),
 100 MHz (Ka-band)

Manufacturer: NASDA

CS3

Orbital location: 132°E (CS3 Sakura-A), 136°E (CS3 Sakura-B)
 Launch: February 1988, NASDA N-II (CS3 Sakura-A);
 September 1988, NASDA N-II (CS3 Sakura-B)
 Expected lifetime: 7 years
 Expected end of life: 1995

Antennas beam coverage overview:

C-band: Japanese archipelago
 Ku-band: Japanese mainland

CS3 EIRP

MINISTRY FOR POSTAL SERVICES AND TELECOMMUNICATIONS

7 Tverskaya Street
103375 Moscow
RUSSIA

Telephone: 095-9255108
Facsimile: 095-2302097
Telex: 064 412961 or
064 411120

Booking Contact:

Aleksandr E. Krupnov, Director, International Cooperation Department

Overview:

Operates the Gorizont, Ekran, Loutch, and Raduga domestic satellite systems. Provides telephone, telegraph and television broadcast through more than 6,000 ground stations.

Services Offered:

- Gorizont satellites: telephone, telegraph, phototelegraph, television, and broadcasting signals within CIS. Also supports international TV and telephony services of Intersputnik. The Orbita, Moskva and Moskva-Global TV broadcast services are transmitted via Gorizont satellites.
- Ekran satellites: direct broadcast satellite service within CIS. The Ekran broadcast system is transmitted on Ekran satellites.
- Loutch satellites: satellite data relay for the Mir space station, TV teleconferencing, emergency communications services
- Raduga satellites: primarily government and military use

Satellite Control Network:

Satellite control: Moscow

RADUGA SYSTEM At A Glance

Satellite name: Raduga 22,28/Statsionar 2 (35°E);
 Raduga 19,24/Statsionar 9 (45°E);
 Raduga 1,2/Statsionar 24 (49°E);
 Raduga 25/Statsionar 20 (70°E);
 Raduga 20,26/Statsionar 3 (85°E);
 Raduga 21,27/Statsionar 15(128°E);
 Raduga 18/Statsionar 10 (190°E)

Spacecraft data:

Mass (in orbit): 1,965 kg
 Eclipse protection: All transponders
 Stabilization: 3-axis
 Launch date: October 1988 (Raduga 22);
 December 1991 (Raduga 28);
 June 1989 (Raduga 19);
 April 1989 (Raduga 24);
 December 1990 (Raduga 1,2);
 February 1990 (Raduga 25);
 March 1988 (Raduga 20);
 December 1990 (Raduga 26);
 December 1987 (Raduga 21); — 128 E
 February 1991 (Raduga 27);
 January 1986 (Raduga 18) — 190 W

Expected lifetime: 5 years

Transponders:

Number: 11
 Power output: 15 W TWTA
 Polarization: LHCP (earth-space link), — }
 RHCP (space-earth link) — ?

Manufacturer: NPO PM

A Note on the Statsionar System:

The ITU registration designation of the Russian satellites is the Statsionar system. Raduga and Gorizont satellites are known by both a Raduga/Gorizont flight number and a Statsionar number. For example, both Gorizont 12 and 22 are in the Statsionar 12 orbital slot.

Raduga

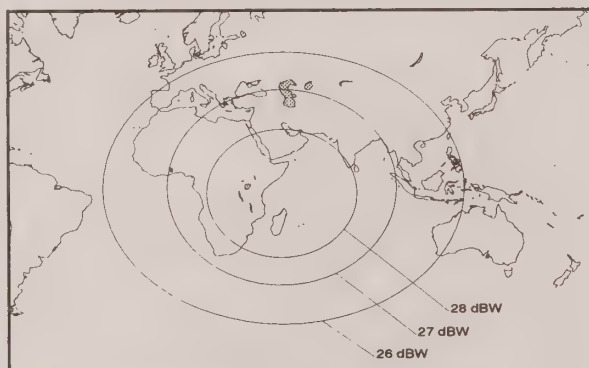
Orbital location: 35°E (Statsionar 2); 45°E (Statsionar 9);
49°E (Statsionar 24); 70°E (Statsionar 20);
85°E (Statsionar 3); 128°E (Statsionar 15); 190°E (Statsionar 10)

Antennas beam coverage overview:

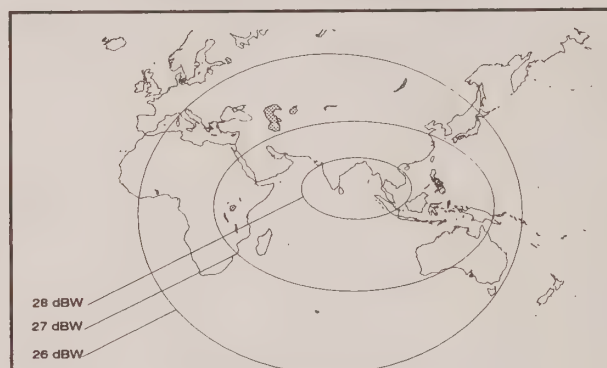
C-band: Indian Ocean region, Western Pacific region, Atlantic Ocean region, CIS, Africa

EIRP Coverage

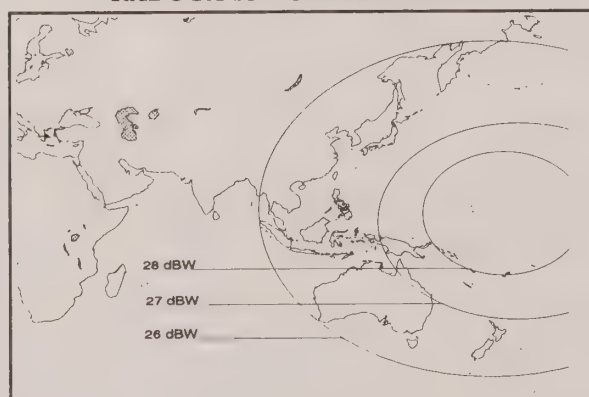
RADUGA 1 -- STATSIONAR 24



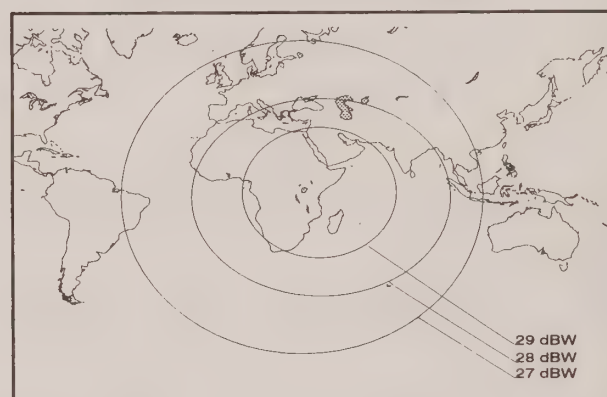
RADUGA 20 -- STATSIONAR 3



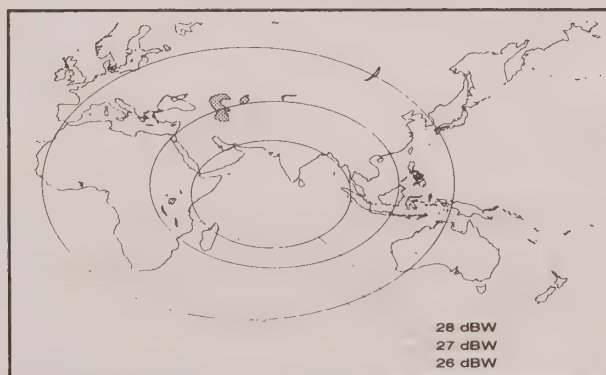
RADUGA 18 -- STATSIONAR 10



RADUGA 22 -- STATSIONAR 2



RADUGA 25 -- STATSIONAR 20



GORIZONT SYSTEM At A Glance

Satellite name: Gorizont 12,22/Statsionar 12 (40°E);
 orizont 16,24/Statsionar 13 (80°E);
 Gorizont 17/Statsionar 5 (53°E);
 Gorizont 18/Statsionar 7 (140°E);
 Gorizont 19/Statsionar 14 (96.8°E);
 Gorizont 13,21/Statsionar 6 (90°E);
 Gorizont 26/Statsionar 11 (11°W);
 Gorizont 14,23,25/Statsionar 21 (103°E)

Spacecraft data:

Mass (in orbit): 2,500 kg
 Primary power (EOL): 1,300 W
 Eclipse protection: All transponders
 Stabilization: 3-axis
 Launch date: June 1986 (Gorizont 12);
 November 1990 (Gorizont 22);
 September 1990 (Gorizont 20);
 August 1988 (Gorizont 16);
 October 1991 (Gorizont 24);
 January 1989 (Gorizont 17);
 July 1989 (Gorizont 18);
 September 1989 (Gorizont 19);
 November 1986 (Gorizont 13);
 November 1990 (Gorizont 21);
 July 1992 (Gorizont 26);
 July 1991 (Gorizont 23);
 April 1992 (Gorizont 25)

Expected lifetime: 5 years

Transponders:

Number: 6 C-band, 1 Ku-band, 1 L-band
 Power output: 5 channels at 15 W; 1 channel at 40 W;
 1 channel (Ku-band spot beam) at 20 W
 L-band channel cross-strapped to C-band
 transponder for L-band Volna service

Polarization: RHCP

Manufacturer: NPO-PM

Gorizont

Orbital location:

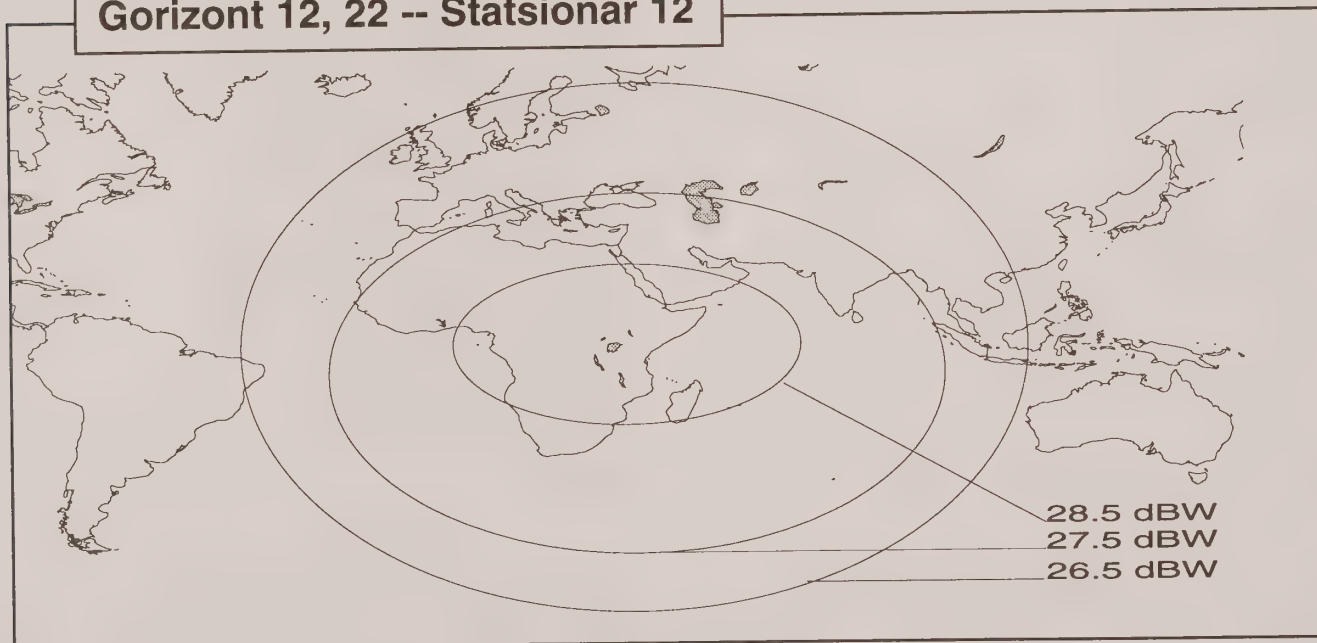
40°E (Statsionar 12); 80°E(Statsionar13);
53°E (Statsionar 5); 140°E (Statsionar 7);
96.8°E (Statsionar 14); 90°E (Statsionar 6);
11°W (Statsionar 11); 103°E (Statsionar 21)

Antennas beam coverage overview:

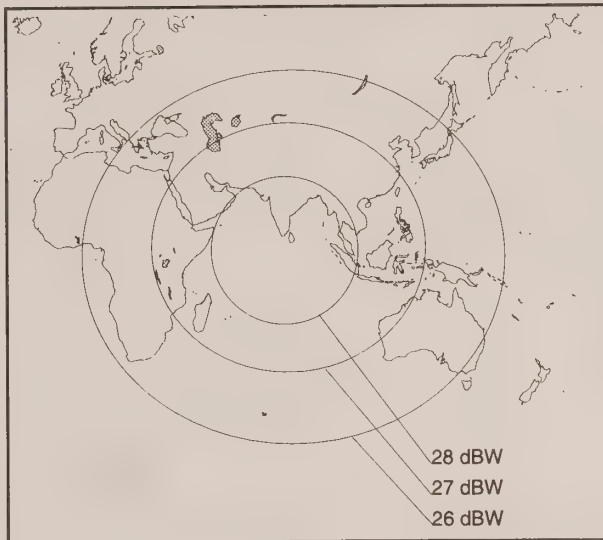
C-band:

Indian Ocean region, Atlantic Ocean region, CIS,
Africa, South America

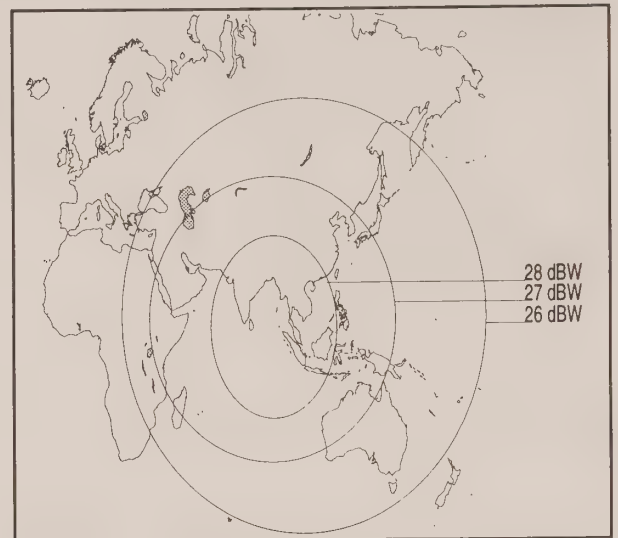
Gorizont 12, 22 -- Statsionar 12



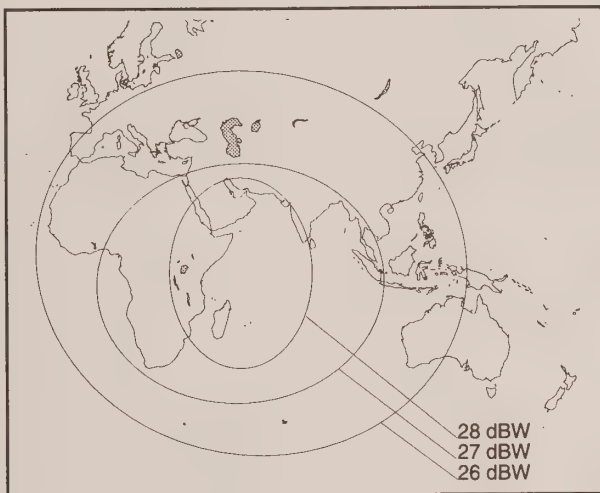
GORIZONT 16, 24 -- STATSIONAR 13



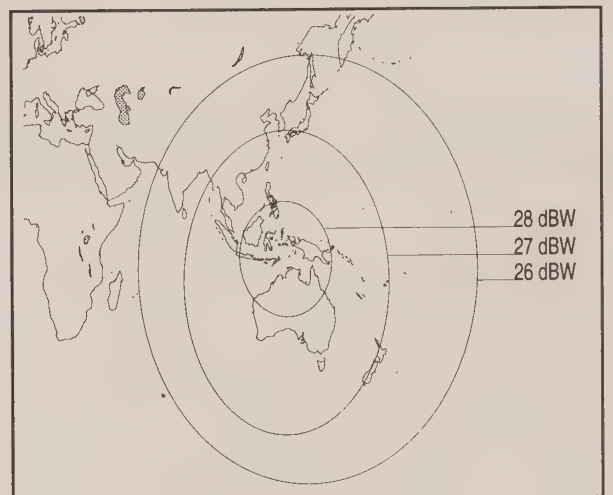
GORIZONT 19 -- STATSIONAR 14



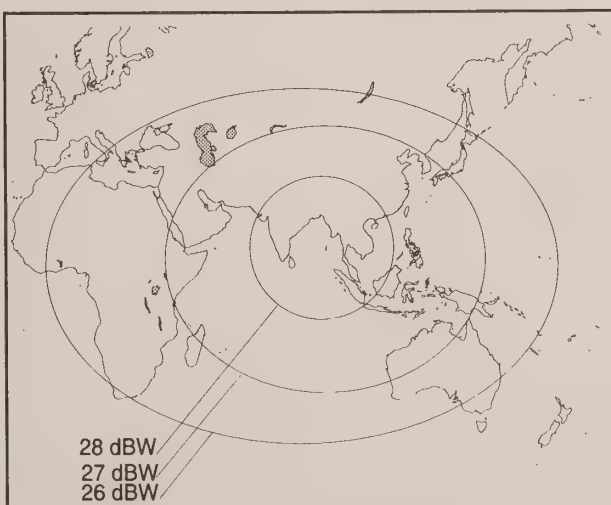
GORIZONT 17 -- STATSIONAR 5



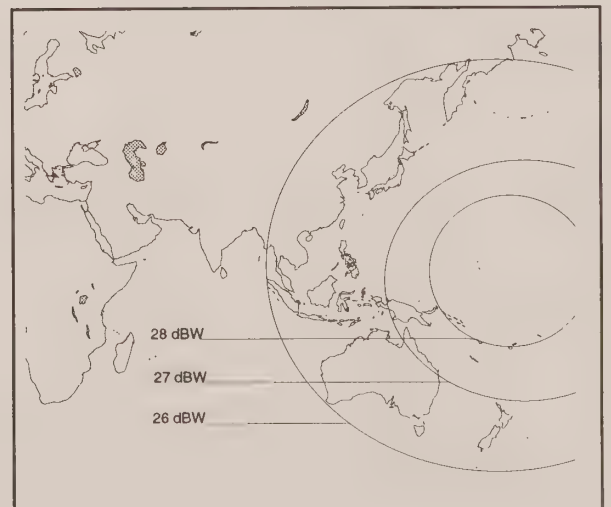
GORIZONT 18 -- STATSIONAR 7



GORIZONT 13, 21 -- STATSIONAR 6



GORIZONT 10 -- STATSIONAR 10



SHINAWATRA SATELLITE COMPANY LTD.

41/103 Rattanathibet Road
Nonthaburi 11000
THAILAND

Telephone: 591-0736 to 49
Facsimile: 591-0706

Contact:

Dr. Avudh Ploysongsang, Senior Manager, Commercial Department

Overview:

The company launched the first satellite in Thailand's first domestic communications satellite system, Thaicom, in December 1993, with plans of launching its second satellite in June 1994. The Ku-band services will cover Southeast Asia, and C-band coverage includes Indochina and the North Pacific Rim.

Proposed Services:

- Direct Service (transponder lease, DBS)
- VSAT (voice, data, video)
- VCS
- Mobile, trunk and thin-route telephony
- TV distribution and DBS
- Private network for government, military and private users

Satellite Control:

Satellite control: Nonthaburi

TT&C stations: Nonthaburi

THAICOM SYSTEM At A Glance

Satellite name:	Thaicom-1 (101°E), Thaicom-2 (78.5°E)*
Spacecraft data:	
Area of coverage:	Southeast Asia (Ku-band); Burma, Cambodia, China, Indonesia, Japan, Korea, Laos, Malaysia, Singapore, Taiwan, Thailand, Vietnam (C-band)
Mass (in orbit):	629 kg
Primary power (EOL):	700 W
Launch date:	December 1993 (T1), June 1994 (T2)
Expected lifetime:	13-15 years
Transponders:	
Number:	2 Ku-band, 54 MHz (1 backup); 10 C-band, 36 MHz (2 backups)
Power output:	47 W TWTA (Ku-band), 11 W SSPA (C-band)
Polarization:	Linear
Uplink frequency:	14.3159-14.4951 GHz 5.925-6.425 GHz
Downlink frequency:	12.5679-12.7471 GHz 3.7-4.2 GHz
Bandwidth:	27/54 MHz (Ku-band), 36 MHz (C-band)
Uplink G/T:	8 dB/K (Ku-band), 5 dB/K (C-band)
EIRP:	51 dBW (Ku-band), 37 dBW (C-band, Thailand), 35 dBW (C-band, North Pacific)
Manufacturer:	Hughes Space and Communications

* To be launched

Thaicom

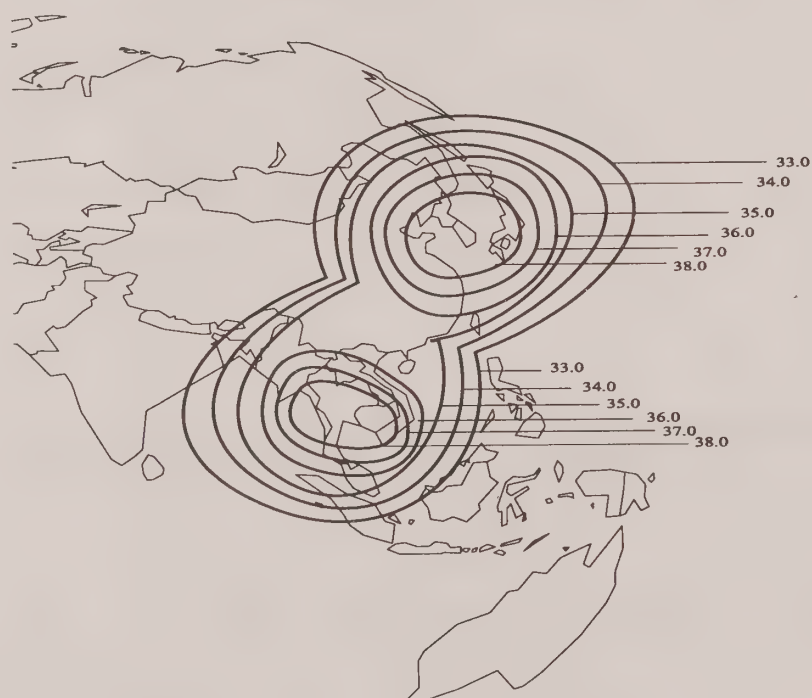
Orbital location: 101°E (T1), 78.5°E (T2)
 Launch: December 1993 (T1); June 1994 (T2)

Antennas beam coverage overview:

C-band: Burma, Cambodia, China, Indonesia, Japan, Korea, Laos, Malaysia, Singapore, Taiwan, Thailand, Vietnam

Ku-band: Southeast Asia

Thaicom C-band EIRP



SECTION 3

PLANNED

SATELLITE

SYSTEMS

Included in This Section:

This section contains planned satellite systems serving the Asia-Pacific region. Operators included in this section are:

1. APT Satellite Company Ltd. 60
2. P.T. Mediacitra Indostar 62
3. P.T. Satelindo 64
4. Nippon Telegraph and Telephone Corporation (NTT) 65
5. Ministry of Communications (Korea) 67

How to Use This Section:

Satellite operators are organized alphabetically by country, then by operator name.

APT SATELLITE COMPANY LTD. ---

Room 3111-3112, 31/F
One Pacific Place
88 Queensway
HONG KONG

Telephone: 26-2281
Facsimile: 522-0419

Contact:

Chen Ji Bin, Vice President

Overview:

APT plans to launch its first satellite, Apstar-1, in June 1994. Its coverage area will include southeast and northern Asia.

Proposed Services:

- Television
- Data
- Voice
- Telecommunications

Satellite Control:

Satellite control: Hong Kong, Macau Region

TT&C stations: Hong Kong, Macau Region

APSTAR SYSTEM At A Glance

Satellite name: Apstar-1 (131°E)
 Spacecraft data:
 Beam coverage: Southeast and northern Asia
 Mass (in orbit): 557 kg
 Primary power: 1,070 W (solstice), 970 W (equinox)
 Eclipse protection: All transponders
 Stabilization: Spin
 Launch date: June 1994
 Expected lifetime: 12 years

 Transponders:
 Number: 24
 Frequency band: C-band
 Power output: 16 W TWTA
 Uplink frequency: 5.845-6.425 GHz
 Downlink frequency: 3.620-4.200 GHz
 Polarization: Linear
 Bandwidth: 20 @ 36 MHz, 4 @ 72 MHz
 EIRP: 36.4 dBW (horizontal transponders),
 37.3 dBW (vertical transponders)

 Single carrier flux density: -88 dBW/sq.m.

 Manufacturer: GM-Hughes

P.T. MEDIACITRA INDOSTAR

Jalan Kebon Sirih 17-19
Jakarta 10340
INDONESIA

Telephone: 21-390-9211

Overview:

Plans to launch Indostar, a direct broadcast satellite of the lightsat class. It is designed to provide digital audio broadcast radio (DAB) and DBS television service to the entire nation of Indonesia. It will be placed in geosynchronous orbit 35,000 kilometers above Indonesia at 105 to 115° E.L. International Technologies Inc. is to manufacture the satellite. Indostar will provide a radio that will be able to receive hundreds of radio channels with quality varying from "FM monaural" to "CD stereo." Indostar will broadcast up to 8 channels of radio programming and ten channels of television.

Proposed Services:

- Digital audio broadcast radio
- Digital DBS television
- Analog DBS television

INDOSTAR SYSTEM At A Glance

Satellite name: Indostar

Spacecraft data:

Area of coverage: Indonesia

Mass (in orbit): 680 kg

Launch date: 1995

Expected lifetime: 10 years

Transponders:

Broadcast frequencies: 1.467-1.492 GHz (radio),
2.520-2.670 GHz (television)

Manufacturer: International Technologies Inc.

P.T SATELINDO

Mulia Centre
Suite 1201
Gr. Hr. Rasuna-said
KAVX6 #8
Jakarta Post # 12940
INDONESIA

Telephone: 21-522-9322
Facsimile: 21-522-9320

Contact:

Iwa Sewaka, President
Sahala Sirarhi, Manager of Bookings

Overview:

Satelindo was established for the private ownership of the forthcoming generation of Palapa satellites, previously controlled by state interests. It is a consortium: PT Bimagraha Telekomindo owns 60 percent; state-run PT Telekom holds 30 percent; and Indosat has a 10 percent share. The Palapa C-series, scheduled for delivery in July 1995 and January 1996, are being manufactured by Hughes Aircraft.

NIPPON TELEGRAPH AND TELEPHONE CORPORATION (NTT)

Number 1-6, Uchisaiwai-cho 1-Chome
Chiyoda-ku
Tokyo 100
JAPAN

Telephone: 3-35093256
Telex: 2225300 NTT HQJ

Contacts:

Haruo Yamaguchi, Chairman
Masashi Kojima, President

Overview:

Plans to launch the C-/Ka-/Ku-/L-band N-Star satellite system in 1995. The satellites will provide fixed satellite service (FSS) and mobile satellite service (MSS).

Proposed Services:

- Telecommunications
- Data communications
- Disaster relief and mobile phone services

N-STAR SYSTEM At A Glance

Satellite name: N-Star 1 (128°E), N-Star 2 (132°E)

Spacecraft data:

Area of coverage: Japanese islands and territorial waters

Mass (in orbit): 1820 kg

Stabilization: 3-axis

Launch date: 1995

Expected lifetime: 10 years

Transponders:

Number: 26

Frequency bands: C-, Ka-, Ku-, and L-band

Manufacturer: Space Systems/Loral

MINISTRY OF COMMUNICATIONS

100, Sejong-ro
Chongro-gu Seoul 110-777
KOREA

Telephone: 2-7502222
Facsimile: 2-7502915

Contact:

Yoon Dong-Yoon, Minister of Communications

Overview:

Plans to launch Koreasat satellite system to provide fixed satellite service and broadcast satellite service to South Korea. GE and Matra are constructing the spacecraft, due for launch in 1995 via Delta II.

Proposed Services:

- DBS
- Video relay
- Digital trunking for inter-city communications
- Remote/Rural area communications
- Wideband digital data
- VSAT

KOREASAT SYSTEM At A Glance

Satellite name:	Koreasat-1 and -2 (116°E collocated)
Spacecraft data:	
Area of coverage:	South Korea
Mass (in orbit):	810 kg
Primary power:	1,533 W
Stabilization:	3-axis
Bus:	GE series 3000
Launch date:	April 1995 (Koreasat-1), October 1995 (Koreasat-2)
Expected lifetime:	10 years
Transponders:	
Number:	12 FSS, 3 BSS
Power output:	12 W TWTA (FSS), 120 W TWTA (BSS)
Uplink frequency:	14.0 -14.5 GHz, 14.5 -14.8 GHz (BSS)
Downlink frequency:	12.25 -12.75 GHz (FSS), 11.7-12.0 GHz (BSS)
Bandwidth:	36 MHz (FSS), 27 MHz (BSS)
Polarization:	Vertical (FSS), LHCP (BSS)
EIRP (EOC):	50.2 dBW (FSS), 59.4 dBW (BSS)
G/T (EOC):	13.5 dB/K (FSS), 13.0 dB/K (BSS)
Manufacturer:	Matra Marconi Space U.K. and GE Astrospace

Koreasat

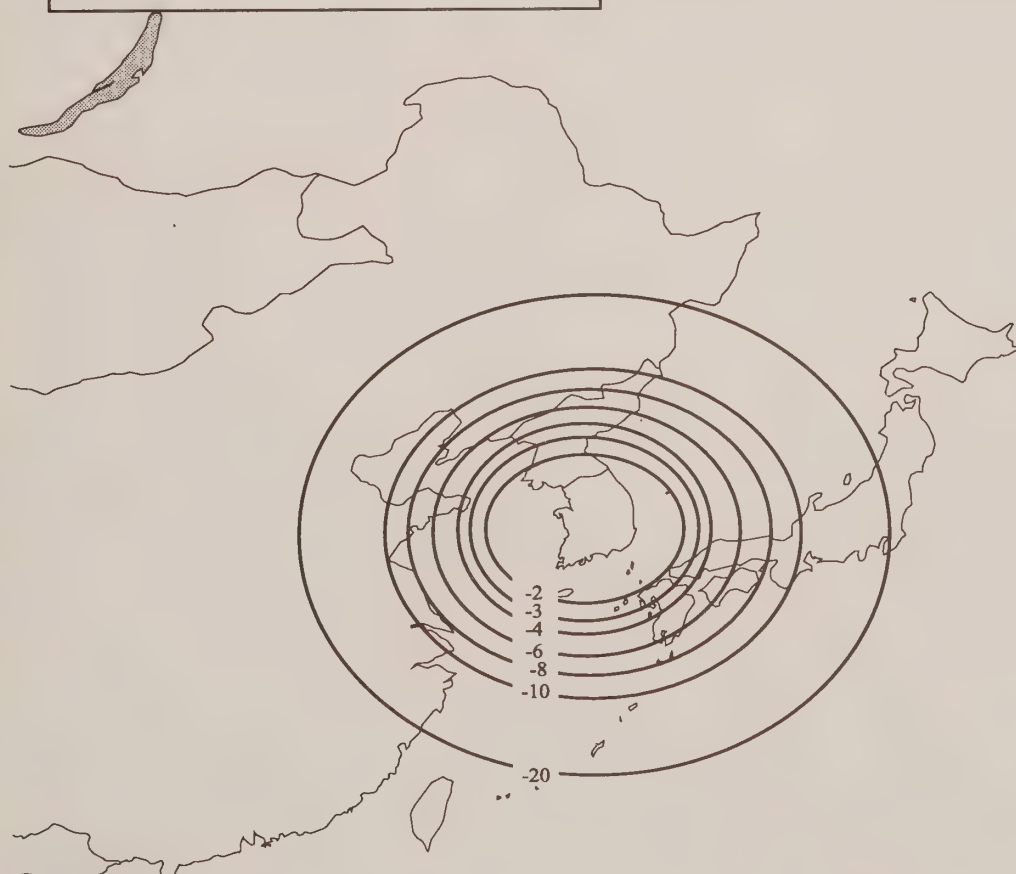
Orbital location: 116°E (Koreasat-1 and Koreasat-2 collocated)
 Launch date: April 1995 (Koreasat-1); October 1995 (Koreasat-2)
 Expected lifetime: 10 years

Antennas beam coverage overview:

Ku-band: South Korea

11.7-12.0

Koreasat BSS EIRP (dBW)



12.25-12.75

Koreasat FSS EIRP (dBW)



SECTION 4

REGIONAL NETWORKS

Included in This Section:

This section contains regional commercial communications satellite systems serving the Asia-Pacific region. They include:

1. Asia Satellite Telecommunications Company Ltd. (Asiasat)	72
2. Pacific Satellite Inc. (Pacstar)	78
3. Intersputnik (International Organization of Space Communications)	80
4. Friendly Islands Satellite Communications Ltd.	86
5. Inmarsat (International Maritime Satellite Organization)	89
6. Columbia Communications Corporation	96
7. Intelsat (International Telecommunications Satellite Organization)	102
8. Panamsat	119
9. Rimsat Ltd.	125
10. TRW Space & Electronics Group	128
11. Unicom Satellite Corporation	130

How to Use This Section:

Profiles are organized alphabetically by country, then by operator name.

ASIA SATELLITE TELECOMMUNICATIONS COMPANY LTD. (ASIASAT) ---

24/F East Exchange Tower
38-40 Leighton Road
Causeway Bay
HONG KONG

Telephone: 805-6666
Facsimile: 576-4111
Telex: 68345 ASAT HX

Contacts:

Andrew Jordan, General Manager of Marketing
Lindy Wong, Corporate Affairs Officer

Overview:

Operates AsiaSat1, a private regional satellite designed for shared domestic services by Asian countries. AsiaSat2, which will provide three times the power and twice the coverage of AsiaSat1, will be launched in the first quarter of 1995 to 100.5°E.

Services Offered:

- National and regional television, domestic voice, data telecommunications, radio broadcasts
- Trunk-route telecommunications: multiple voice and data circuits between major cities
- Thin-route telecommunications: rural telephony or private networks
- Point-to-multipoint services

Satellite Control:

TT&C stations: Stanley Earth Station, Hong Kong

ASIASAT 1 SYSTEM At A Glance

Satellite name: AsiaSat 1 (105.5°E)

Spacecraft data:

Mass (in orbit): 1,250 kg

Stabilization: Spin

Eclipse protection: All transponders

Primary power (EOL): 668 W (summer solstice);
748 W (autumn equinox)

Launch date: April 1990

Expected lifetime: 9-10 years

Transponders:

Number: 24

Power output: 8.2 W TWTA

Polarization: Dual linear

Single carrier saturation flux density: -81 to -90 dBW/sq.m.

Manufacturer: Hughes

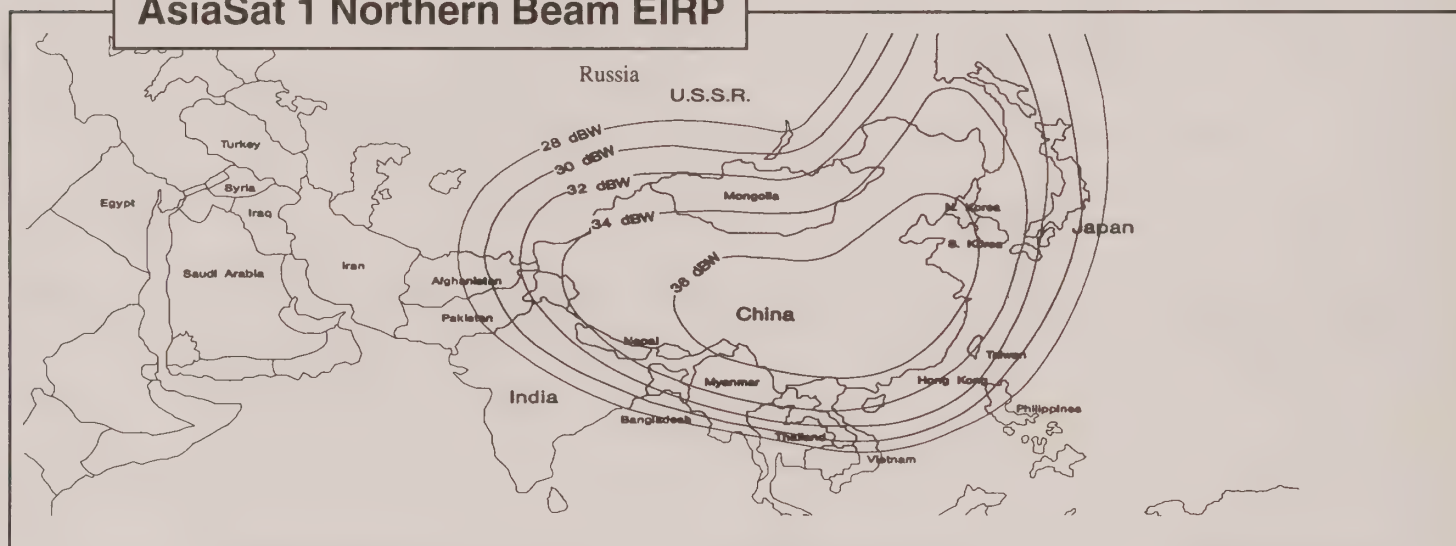
AsiaSat 1

Orbital location: 105.5°E
 Launch: April 1990, Long March 3
 Expected lifetime: 9-10 years
 Expected end of life: 1999-2000

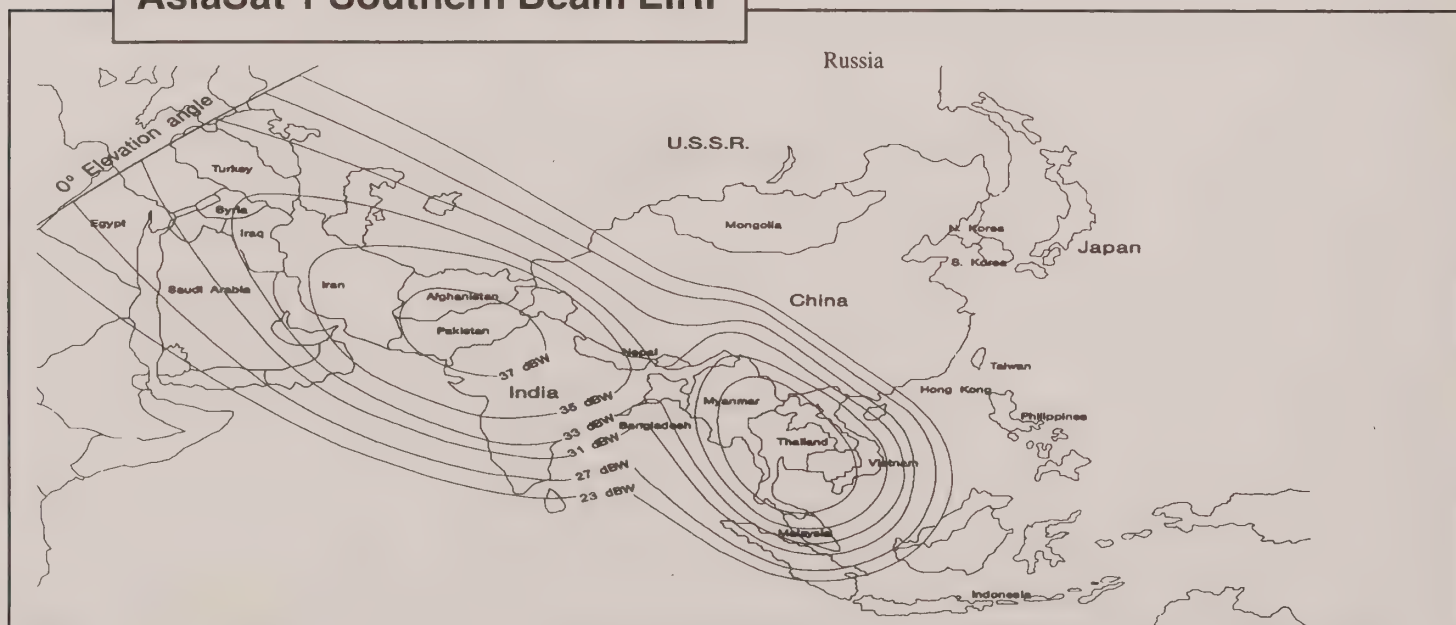
Antennas beam coverage overview:

C-band: China, Pakistan, Thailand and neighboring countries

AsiaSat 1 Northern Beam EIRP



AsiaSat 1 Southern Beam EIRP



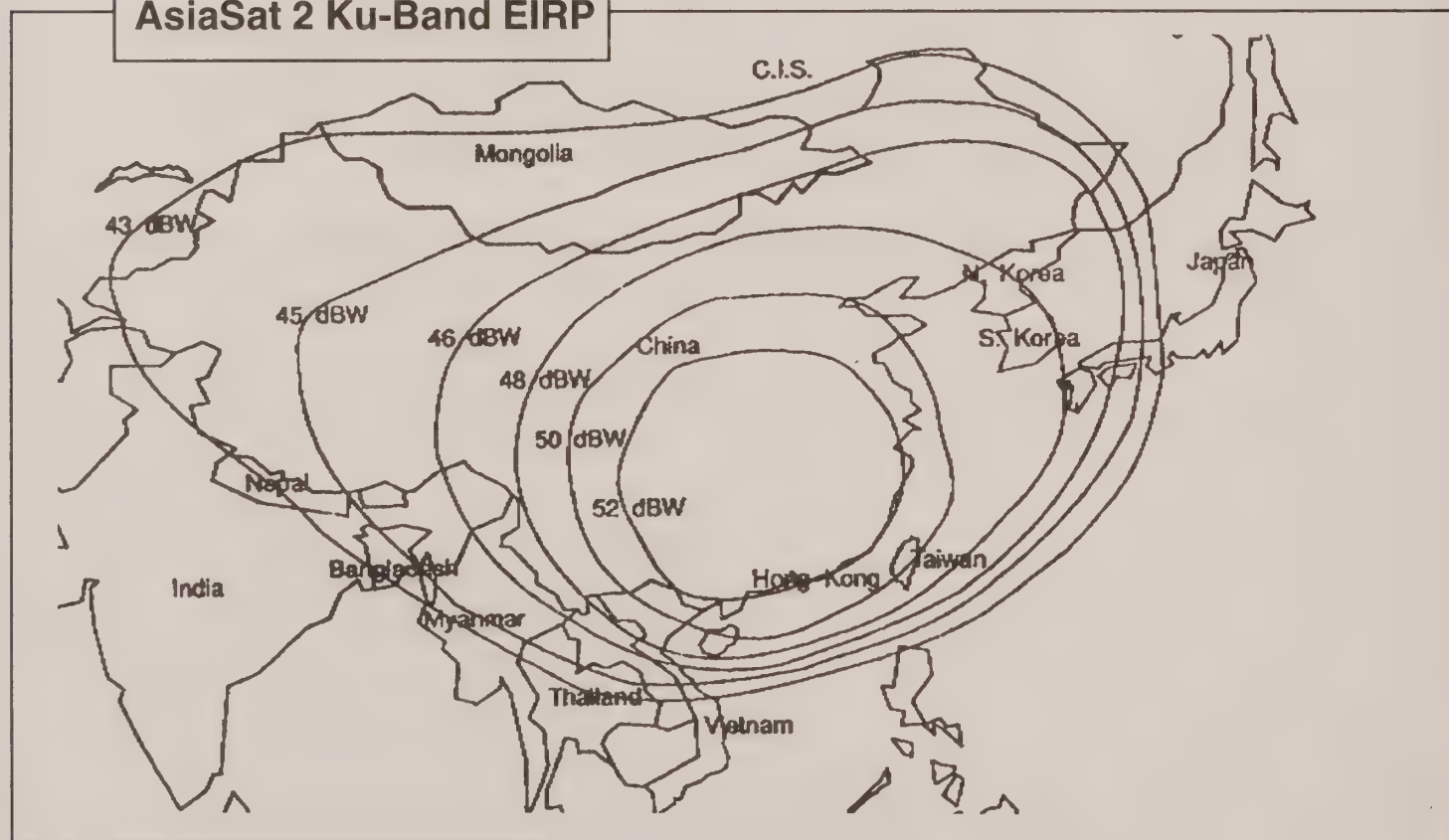
AsiaSat 2

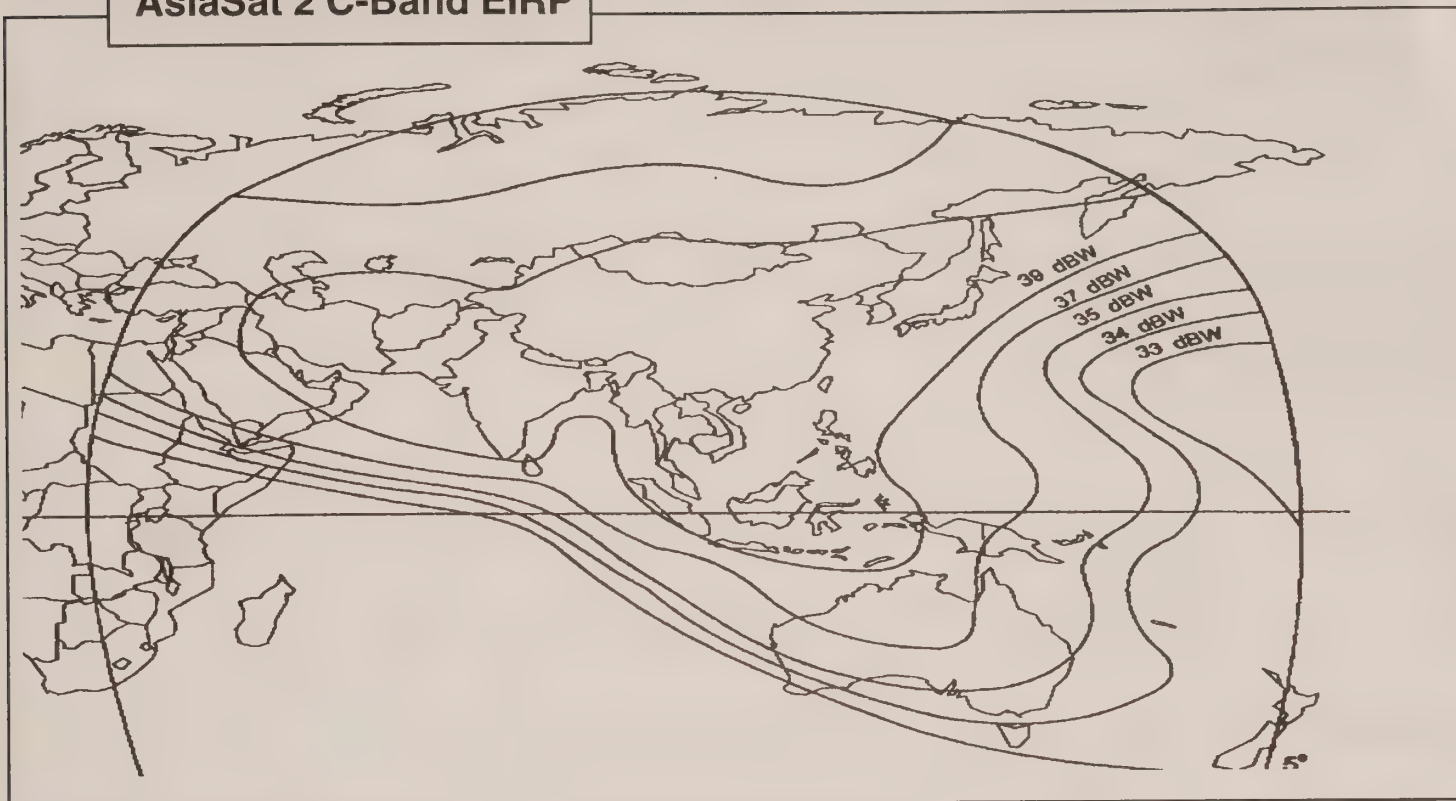
Orbital location:	100.5°E
Launch:	First quarter 1995
Expected lifetime:	15 years
Expected end of life:	2010

Antennas beam coverage overview:

C-band:	China, Japan, Indonesia, India, Middle East, Eastern Europe
Ku-band:	China, Hong Kong, Taiwan, Korea

AsiaSat 2 Ku-Band EIRP



AsiaSat 2 C-Band EIRP

PACIFIC SATELLITE INC.

(PACSTAR)

Angau Center
Angau House
Boroko
PAPUA NEW GUINEA

Telephone: (612)257-2608
Facsimile: (612)257-1169

Contacts:

Kim E. Degnan, General Manager
John K. Kamblijambi, Director, phone: (675)27-4626; fax: (675)25-6868

Overview:

Pacstar will provide regional and domestic transponder capacity customized to meet specific user requirements. Pacific Satellite Inc. (PSI) is the corporate vehicle which consolidates ownership interests in Pacstar.

Proposed Services :

- Bulk lease or sale outright of transponders to be used for services at the full discretion and control of the transponder customer.

PACSTAR SYSTEMS At A Glance

Satellite name:	Pacstar 1 (167.45°E), Pacstar 2 (175°W)
Spacecraft data:	
Area of coverage:	Korea, Taiwan, Singapore, Malaysia, Thailand, Philippines, Hong Kong, U.S. West Coast, Hawaii, Pacific Island nations including Oceania with beams optimized for Papua New Guinea, Fiji, Micronesia, French Polynesia
Mass (in orbit):	1,250 kg
Eclipse protection:	All transponders
Launch date:	December 1994 (Pacstar 1); March 1996 (Pacstar 2)
Expected lifetime:	12 years
Transponders:	
Number:	24 (lightsat options are under review)
Uplink frequency:	6.495-7.076 GHz; 14.0-14.5 GHz
Downlink frequency:	3.615-4.196 GHz; 11.957-12.660 GHz
Bandwidth:	36MHz (C-band); 72 MHz (Ku-band); 54 MHz (Ku-band)
EIRP:	36-44 dBW (C-band Asia beams); 34-44 dBW (C-band Pacific beams); 39-42 dBW (C-band U.S. beams); 54-58 dBW (Ku-band)

INTERSPUTNIK

(INTERNATIONAL ORGANIZATION OF SPACE COMMUNICATIONS)

2nd Smolensky, 1/4
121099 Moscow
RUSSIA

Telephone:	095-244-0333
Facsimile:	095-253-9906
Telex:	411288 DISKSU

Booking Contact:

Booking office (24 hours): 095-241-7273

Public Relations Contact:

Neil Bakmann, Director of Marketing, 095-244-0698

Overview:

Established in 1971, Intersputnik provides international communications to existing or potential customers as well as assistance in establishing communication channels and creation of terrestrial technical facilities for operation in the system.

Services Offered:

- Telephony, facsimile, telex and data exchange in international, domestic and regional public networks as well as in dedicated networks
- International exchange of TV and audio programs
- Regional TV and audio broadcasting in VSAT networks
- Videoconferencing and business networks

Satellite Control:

TT&C station:	Dubnan (Atlantic Region) - Statsionar 4
	Vladimir (Indian Region) - Statsionar 13

Intersputnik Member Countries And Their Earth Stations

Member Nation	Earth Station	Satellite
Afghanistan	Shamsad	Statsionar 4
Bulgaria	Shipka	Statsionar 4
Hungary	Balaton	Statsionar 4
Vietnam	Hoasen-1 and -2	Statsionar 13
Germany	New Golin-2	Statsionar 4
	New Golin-1	Statsionar 13
Georgia	None	N/A
Yemen	Ras-Boradli-3	Statsionar 4
Korea	Pyongyang	Statsionar 13
Kazakhstan	None	N/A
Cuba	Caribe	Statsionar 4
Laos	Dokboua	Statsionar 13
Mongolia	Naran	Statsionar 13
Nicaragua	Diriangua	Statsionar 4
Poland	Psary	Statsionar 4
Romania	None	N/A
Syria	Sednaya	N/A
Russia	Dubna, Arbat	Statsionar 4
	Vladimir, Novosibirsk	Statsionar 13
Czech Republic	Sedlec-1	Statsionar 4
	Sedlec-2	Statsionar 13

Earth Stations In Non-Member Countries

Nation	Earth Station	Satellite
Iraq	Dudjail	Statsionar 4
Canada	Mill Village, Pennant Point-02A	Statsionar 4
Madagascar	Antananarivo	Statsionar 4
USA	Roaring Creek, Staten Island Fort Dietrick, Holmdel, Isoz (Atlanta)	Statsionar 4
Cambodia	Bayon	Statsionar 13
China	Beijing	Statsionar 13
Japan	Ibaraki-2	Statsionar 13

GORIZONT SYSTEM (STATSIONAR 13) At A Glance

Satellite name: Gorizont 16/Statsionar 13 (80°E)

Spacecraft data:

Stabilization: 3-axis

Launch date: October 1991

Expected lifetime: 3-5 years

Transponders:

Number: 6 C-band, 1 Ku-band

Power output: 65 W TWTA (Transponder 6);

12.5 W TWTA (Tr. 7-11);

15 W TWTA (Tr. 12)

Polarization:

Uplink: LHCP

Downlink: RHCP

Single carrier saturation flux density: -80 dBW/sq.m.

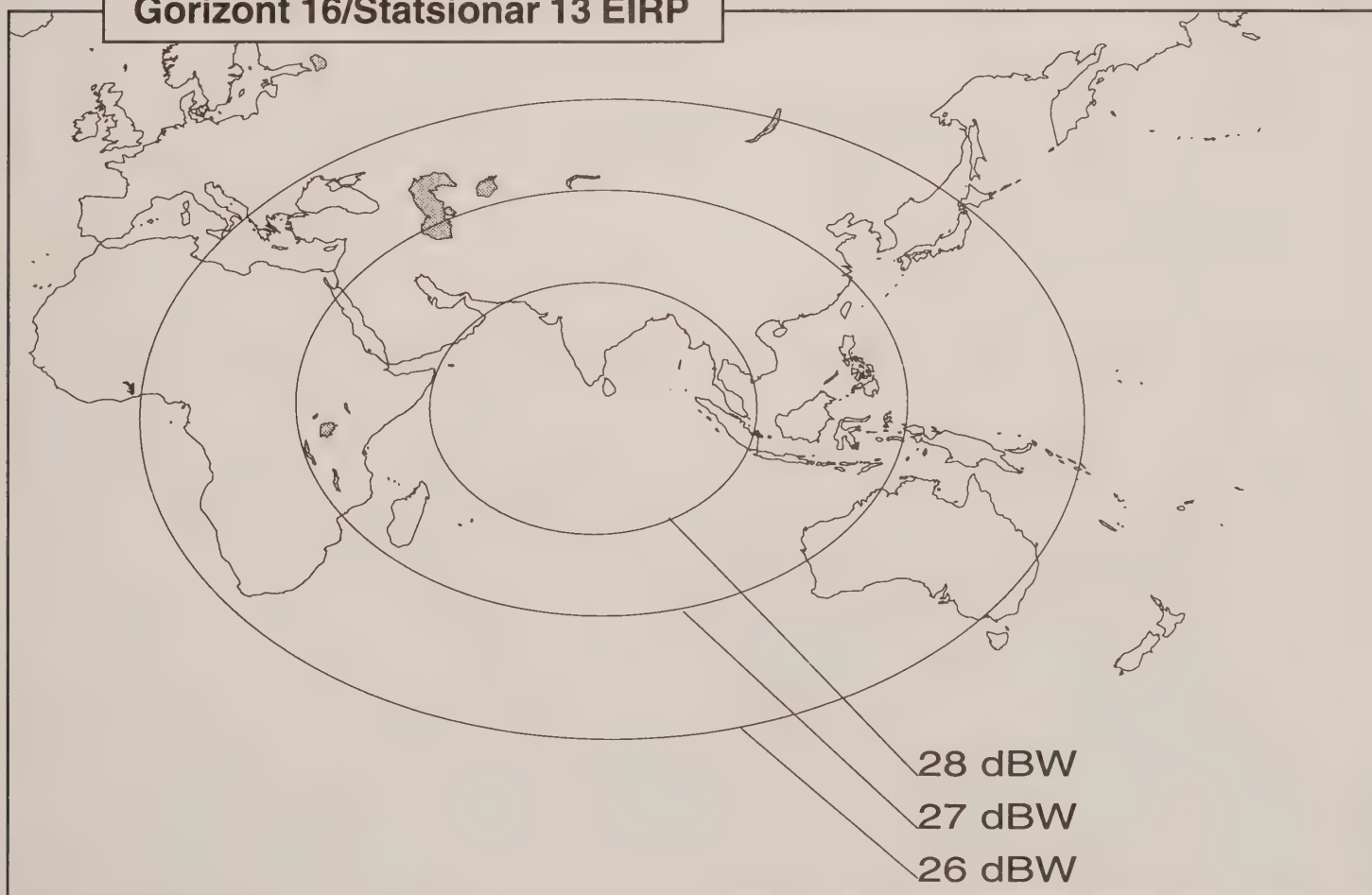
Manufacturer: NPO-PM

Gorizont 16/Statsionar 13

Orbital location:	October 1991, Proton (Statsionar 13)
Expected lifetime:	3-5 years
Expected end of life:	1996

Antennas beam coverage overview:

C-band, Ku-band:	Europe, Africa, North and South America
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Gorizont 16/Statsionar 13 EIRP

EXPRESS SYSTEM At A Glance

Satellite name: Express (initially to replace Gorizonts at 0°, 103° and 140° W; subsequent locations 53°, 80°, 90°, 96.5° E, and 14° and 11° W)

Spacecraft data:

Mass: 2,500 kg
 Stabilization: 3-axis
 Launch date: TBD
 Expected lifetime: 3 years

Transponders:

Numbers: a) One 40W TWTA C-band spotbeam, BW 40MHz, EIRP 45dBW;
 b) 5x15 W TWTA C-band, EIRP 32 dBW;
 c) One 20 W TWTA Ku-band, EIRP 40 dBW;
 d) One L-band (cross-strapped to C-band transponder)

Developer: NPO-PM/NIKP

* To be launched

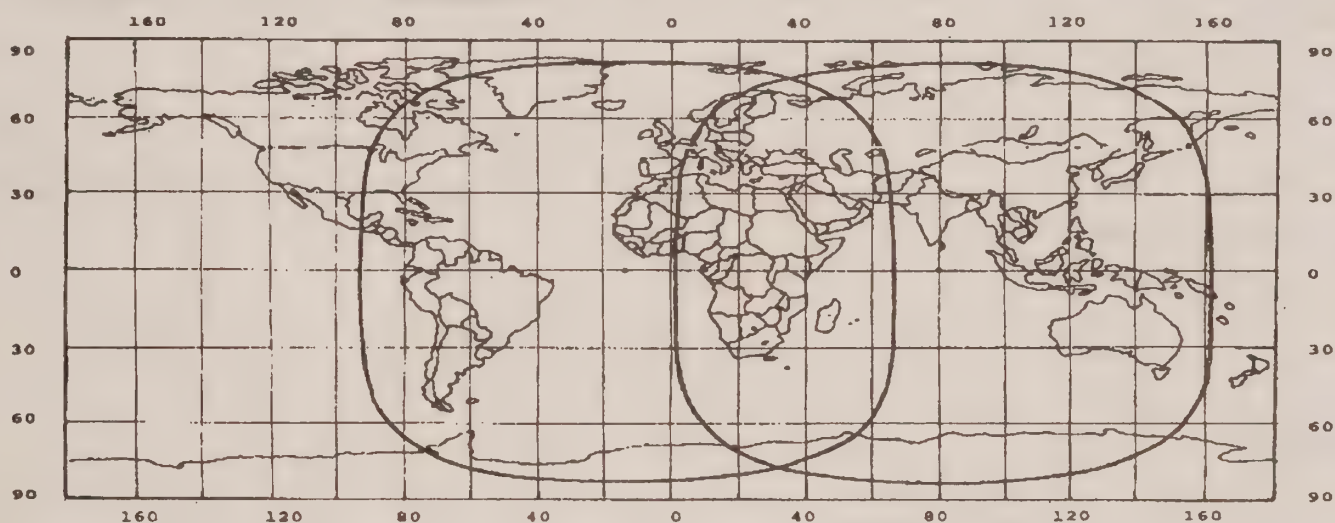
Express

Orbital location: 14°W, 80°E
 Launch: TBD
 Expected lifetime: 3 years

Antennas beam coverage overview:

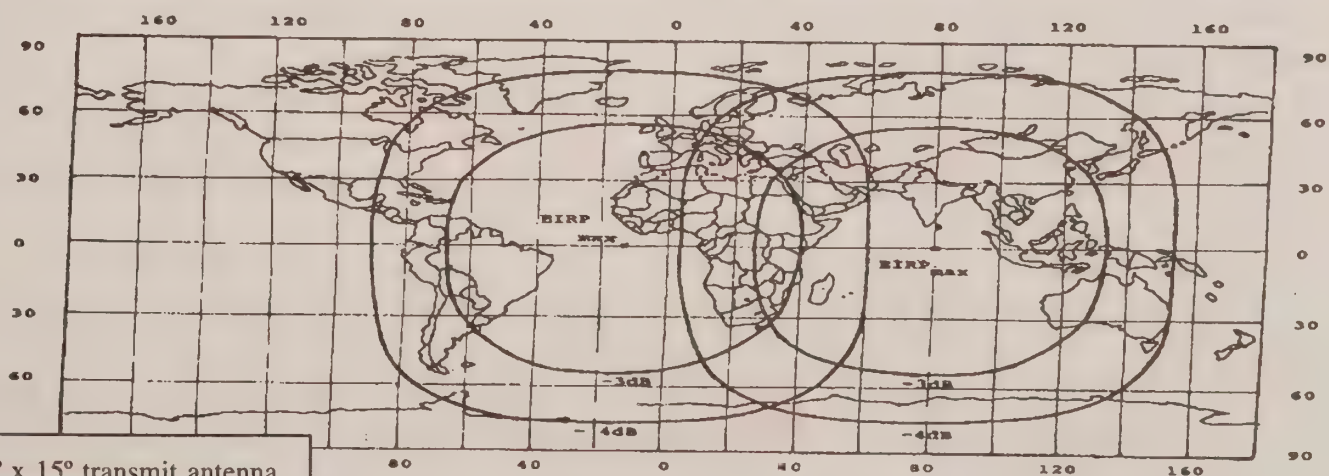
C-band , Ku-band: Europe, Africa, North and South America

Express Receive Antennas Coverage (14°W and 80°E)



Global (17° x 17°) receive antenna

Express Transmit Antennas Coverage (14°W and 80°E)



15° x 15° transmit antenna

FRIENDLY ISLANDS SATELLITE COMMUNICATIONS LTD.

TONGA OFFICE:
(Headquarters)
P.O. Box 2921
Nuku 'Alofa
TONGA

Telephone: 24160
Facsimile: 23322

PHILIPPINES OFFICE:
LPL Center, 22nd Floor
130 Alfaro Street
1200 Metro Manila
PHILIPPINES

Telephone: 2-817-6128, 2-810-5548
Facsimile: 2-817-6112, 2-812-1033

USA OFFICE:
3585 Moultrie Avenue
San Diego, CA 92117
USA

Telephone: (619)270-9996
Facsimile: (619)270-4652

Contacts:

Matt C. Nilson, Managing Director
H.R.H. Princess Salote Pilolevu Tuita, Chairwoman

Overview:

Tongasat is an Asia-Pacific regional satellite system to be owned and operated by participating administrations of several countries (International Ownership Body) in the region. At press time, two satellites are in operation, Rimsat-1 and Rimsat-2.

Tongasat was granted seven orbital positions by the International Telecommunications Union (ITU) at 130°E, 134°E, 138°E, 142.5°E, 70°E, 83.3°E, and 170.75°E. These positions provide service within the Asia-Pacific region, and serve as ideal locations for transpacific links and links with Europe to the Asia-Pacific region.

During the process, Tongasat licensed two private system operators, Rimsat and Unicom, to place satellites into five of the positions to provide international satellite services. Tongastar-1, Tonga's first communications satellite, has been in position at 134°E since August 1993. The second satellite, Rimsat-1, was successfully launched into 130°E on November 18, 1993 by Rimsat. Unicom is planning two satellites in Tongasat positions 70°E and 170.75°E for 1996 operation. See Rimsat Ltd. for coverage maps of satellite at 130°E.

Services Offered:

- Television
- Data
- Telephony

Tongasat Coverage



INMARSAT

(INTERNATIONAL MARITIME SATELLITE ORGANIZATION)

99 City Road
London EC1Y 1AX
UNITED KINGDOM

Telephone: 71-728-1000
Facsimile: 71-728-1044
Telex: 297201 INMSAT G

Booking Contact:

Eugene Jilg, Executive Vice President

Public Relations Contact:

Elizabeth Hess, Manager of Press Office

Overview:

Established in 1979 to serve the maritime community, Inmarsat is now the world's largest provider of global mobile satellite communications for commercial and distress and safety applications, at sea, in the air and on land. To provide its services, Inmarsat uses its own Inmarsat-2 satellites and leases the Marecs B2 satellite from the European Space Agency, maritime communications subsystems (MCS) on several Intelsat V satellites, and capacity on 3 Marisat satellites from Comsat.

Services Offered:

- Direct-dial telephone, telex, facsimile, electronic mail, and data connections for maritime applications
- Flight deck voice and data
- Automatic position and status reporting and direct-dial passenger telephone, facsimile and data services for aircraft
- Two-way data communications, position reporting, electronic mail and fleet management for land transport
- Two-way telephone services via transportable and portable terminals

Inmarsat Member Countries

Country	Signatory	Investment share %
Algeria	Ministère des Postes et des Télécommunications	0.07375
Argentina	Comision Nacional de Telecomunicaciones	0.23459
Australia	Australian and Overseas Telecommunications	1.20454
Bahrain	Ministry of Transportation	0.12645
Belgium	Regie des Telegraphes et des Telephones	
Brazil	Empresa Brasileira de Telecomunicacoes (Embratel)	1.57990
Bulgaria	Navigation Maritime Bulgare Ltd.	0.14137
Cameroon	International Telecommunications Organization of Cameroon (Intelcam)	0.05000
Canada	Teleglobe Canada Inc.	2.19377
Chile	Empresa Nacional de Telecomunicaciones (Entel-Chile)	0.06570
China	Beijing Marine Communications and Navigation Company	
Colombia	Empresa Nacional de Telecomunicaciones	0.05000
Croatia	Ministry of Maritime Affairs	0.05000
Cuba	Ministerio de Comunicaciones	0.05000
Cyprus	Cyprus Telecommunications Authority (CYTA)	1.41571
Czech Republic	Federal Ministry of Posts and Telecommunications	0.05000
Denmark	Tele Danmark A/S	2.00364
Egypt	National Telecommunications Organization (Arento)	0.26788
Finland	Telecom Finland	0.25274
France	France Telecom	5.41038
Gabon	Telecommunications Internationales Gabonaises (TIG)	0.05000
Germany	Deutsche Bundespost Telekom	2.77259
Greece	Hellenic Telecommunications Organization (OTE)	2.49408
Iceland	Posts and Telecommunications Administration	0.05000
India	Videsh Sanchar Nigam Ltd.	0.43266
Indonesia	PT Indonesian Satellite Corp. (PT Indosat)	0.27080
Iran	Telecommunication Company of Iran	0.27459
Iraq	Iraqi Telecommunications and Posts	0.05000
Israel	Ministry of Communications	0.07656
Italy	Telespazio SpA	2.74471
Japan	Kokusai Denshin Denwa Co. Ltd. (KDD)	9.07135
Korea, Republic of	Korea Telecom	0.98519
Kuwait	Ministry of Communications	0.72143
Liberia	Ministry of Maritime Affairs	0.15228

Inmarsat Member Countries (Continued)

Country	Signatory	Investment share %
Malaysia	Telekom Malaysia Berhad	0.17648
Malta	Telemalta Corporation	0.05000
Mauritius	N/A	
Monaco	Direction Générale des Postes et Télécommunications	0.09563
Mozambique	Empresa Nacional de Telecomunicacoes de Mozambique EE	0.05000
Netherlands	PTT Nederland BV	2.51223
New Zealand	Telecom New Zealand International Ltd.	0.17247
Nigeria	Nigerian Telecommunications Ltd.	0.10123
Norway	Norwegian Telecom	10.65912
Oman	Ministry of Posts, Telegrams and Telephones	0.05000
Pakistan	Pakistan Telecommunications Corporation	0.00500
Panama	Instituto Nacional de Telecomunicaciones	0.09822
Peru	Empresa Nacional de Telecomunicaciones del Peru	0.05000
Philippines	Philippine Telecommunications Satellite Corporation	0.12075
Poland	Ministry of Transport and Maritime Economy	0.42527
Portugal	Companhia Portuguesa Radio Marconi SA	0.26280
Qatar	Qatar Public Telecommunication Corporation	0.09961
Romania	Ministry of Communications	0.05000
Russian Federation*	Morsviazsputnik	4.35741
Saudi Arabia	Ministry of Posts, Telegraphs and Telephones	1.51317
Singapore	Singapore Telecommunications Private Ltd.	2.12717
Spain	Telefonica de Espana SA	1.84005
Sri Lanka	The Overseas Telecommunications Service	0.05000
Sweden	Swedish Telecom Radio	0.78112
Switzerland	General Directorate of Swiss PTT	0.54065
Tunisia	Republic of Tunisia	0.06045
Turkey	General Directorate of Post, Telegraph and Telephone	0.11724
United Arab Emirates	Ministry of Communications	0.44119
United Kingdom	British Telecom plc.	11.73976
USA	Communications Satellite Corporation	24.62978
Yugoslavia	Community of Yugoslav Posts, Telegraphs and Telephones	0.09822

*Includes initial investment shares of Belarus and Ukraine

Coast Earth Stations

Inmarsat-A

Country	Location	Operator	Coverage Region	Access Code	
				(Octal)	(Decimal)
Australia	Gnangara	IDB Comms Group Inc.	IOR	13	11
Australia	Perth	OTC Australia	IOR/POR	02	02
Brazil	Tangua	Embratel	AORE	14	12
China	Beijing	Beijing Marine Coms. & Navs.	POR/IOR	11	09
Denmark, Finland, Iceland, Norway, Sweden	Eik	Norwegian Telecom	IOR/AORE/AORW	04	04
Egypt	Maadi	National Telecoms Organisation	AORE	15	13
France	Pleumeur Bodou	France Telecom	AORW/AORE	11	09
Germany	Raisting	Fernmeldetechnisches Zentralamt	AORE	15	13
Greece	Thermopylae	OTE SA	IOR	05	05
India	Aarvi	Videsh Sanchar Nigam Ltd.	IOR	06	06
Iran	Boumehen	Telecomm Company of Iran	IOR	14	12
Italy	Fucino	Telespazio	AORE	05	05
Japan	Yamaguchi	Kokusai Denshin Denwa	POR/IOR	03	03
Korea, Republic of	Kumsan	Korea Telecom Authority	POR	04	04
Netherlands	Burum	PTT Nederland NV	AORE/IOR	12	10
Poland	Psary	Ministry Transp./Marit. Economy	AORE/IOR	16	14
Russia	Nakhodka	Morsviazsputnik	POR	12	10
Saudi Arabia	Jeddah	Ministry of PTT	IOR	15	13
Singapore	Sentosa	Telecom Authority of Singapore	POR	10	08
Turkey	Anatolia	Comsat Mobile Communications	IOR	01	01
Turkey	Ata	General Directorate of PTT	IOR/AORE	10	08
UK	Goonhilly	British Telecom International	AORW/AORE	02	02
Ukraine	Odessa	Morsviazsputnik	AORE/IOR	07	07
USA	Niles Canyon	IDB Comms. Group Inc.	POR/AORW	13-1	11-1
USA	Santa Paula	Comsat Mobile Communications	POR	01	01
USA	Southbury	Comsat Mobile Communications	AORW/AORE	01	01
USA	Staten Island	IDB Comms Group Inc.	AORE	13-1	11-1

Inmarsat-C

Country	Location	Operator	Coverage Region	Access Code
Australia	Perth	OTC Australia	IOR/POR	302/202
Brazil	Tangua	Embratel	AORE	114
Denmark, Finland, Iceland, Norway, Sweden	Blaavand	Telecom Denmark	AORE	131
Denmark, Finland, Iceland, Norway, Sweden	Eik	Norwegian Telecom	IOR	304
France	Pleumeur Bodou	France Telecom	AORW/AORE	011/111
Germany	Raisting	Fernmeldetechnisches, Zentralamt	AORE	115
Netherlands	Burum	PTT Nederland NV	AORE/IOR	112/312
Singapore	Sentosa	Telecom Authority of Singapore	POR	210
UK	Goonhilly	British Telecom International	AORW/AORE	002/102
USA	Santa Paula	Comsat Mobile Communications	POR	201
USA	Southbury	Comsat Mobile Communications	AORW/AORE	001/101

KEY

AORE: Atlantic Ocean Region East
AORW: Atlantic Ocean Region West
IOR: Indian Ocean Region
POR: Pacific Ocean Region

Coast Earth Stations (Continued)

Planned for Inmarsat-A and C

Country	Location	Operator	Coverage Region	System (A/C)
Argentina	Balcarce	Comision Nacional de Telecom	AORE	A
China	Beijing	Beijing Marine Coms. & Nav. Co.	POR/IOR	C
Cuba	N/A	Ministry of Communications	AOR	A
Greece	Thermopylae	OTE SA	IOR	C
India	Aarvi	Videsh Sanchar Nigam Ltd.	IOR	C
Iran	Boumehen	Telecomm Co. of Iran	IOR	C
Italy	Fucino	Telespazio	AORE	C
Korea, Republic	Kumsan	Korea Telecom Authority	IOR/POR	A/C
Kuwait	Umm-al-Aish	Ministry of Communication	AOR	A
Iceland, Norway, Sweden, Denmark, Finland	Eik	Norwegian Telecom	AORW	A
Poland	Psary	Ministry Transp. Marit. Economy	IOR	C
Portugal	Lisbon	Comp. Portuguesa Radio Marconi	AORE	C
Russia	Nakhodka	Morsviazputnik	POR	C
Saudi Arabia	Jeddah	Ministry of PTT	AORE/IOR	A/C
Singapore	Sentosa	Telecom Authority of Singapore	IOR	C
Spain	Buitrago	Telefonica de Espana SA	AORE	A/C
Turkey	Ata	General Directorate of PTT	IOR	C
Ukraine	Odessa	Morsviasputnik	AORE/IOR	C

KEY

AORE: Atlantic Ocean Region East
AORW: Atlantic Ocean Region West
IOR: Indian Ocean Region
POR: Pacific Ocean Region

INMARSAT-2 SYSTEM At A Glance

Satellite name: Inmarsat-2 F1 (64.5°E); Inmarsat-2 F2 (15.5°W);
Inmarsat-2 F3 (179.5°E); Inmarsat-2 F4 (55°W)

Spacecraft data:

Mass (in orbit): 824 kg
Stabilization: 3-axis
Primary power (EOL): 1,142
Launch date: October 1990 (F1); March 1991 (F2);
December 1991 (F3); April 1992 (F4)
Launch vehicle: Delta II (F1, F2); Ariane (F3, F4)
Expected lifetime: 10 years

Transponders:

Satellite-shore frequencies:

Uplink: 6.425-6.443 GHz
Downlink: 3.600-3.623 GHz
Satellite EIRP: 24.0 dBW global coverage

Satellite-ship frequencies:

Uplink: 1.6265-1.6495 GHz
Downlink: 1.530-1.548 GHz
Satellite EIRP 37.7 dBW (beam edge),
39.0 dBW (beam center)

Manufacturer: British Aerospace

INMARSAT- 3 SYSTEM At A Glance

Satellite name: Inmarsat-3 F1; Inmarsat-3 F2;
Inmarsat-3 F3; Inmarsat-3 F4
(orbital locations to be determined)

Spacecraft data:

Mass (on orbit, BOL): 1,100 kg
Stabilization: 3-axis
Primary power (EOL): 2,400 W
Eclipse protection: All transponders
Launch dates: 1995
Expected lifetime: 13 years

Transponders:

Number: L-band matrix array generating 1 global
beam, 5 spot beams and global
GPS/Glonass overlay; 2 C-band
Power output: 20 W SSPA (L-band), 12 W SSPA (C-band)
Polarization: Circular (L-band), dual circular (C-band)
Uplink frequency: 1.63-1.66 GHz (L-band);
6.43-6.45 GHz (C-band)
Downlink frequency: 1.53-1.56 GHz (L-band);
3.60-3.63 GHz (C-band)
EIRP: 48 dBW (L-band), 27 dBW (C-band)

Manufacturer: Martin Marietta

COLUMBIA

COMMUNICATIONS CORPORATION

4733 Bethesda Avenue
Suite 610
Bethesda, MD 20814
USA

Telephone: (301)907-8800
Facsimile: (301)907-2420

Contact:

John M. Greene, Program Manager, Sales Support

Overview:

With 12 transponders on each of two NASA tracking and data relay satellite system satellites located at 41°W in the Atlantic and 174°W in the Pacific, Columbia can provide its customers single-system connectivity stretching from the Philippines north to Hong Kong, Taiwan, China, Japan, Korea, and the Russian Far East, across the Pacific and throughout North America, crossing the Atlantic and covering all of Europe, including Eastern Europe and the Mediterranean. The footprints of the two TDRS satellites overlap in the central United States.

Services Offered:

- Video
- Private line voice and data
- Public switched network (PSN) interconnection
- Custom bandwidth applications
- East and west beams operate in broadcast mode simultaneously
- Non-preemptible geostationary capacity

Satellite Control Network:

Satellite control:	Pittsburgh, PA, Brewster, WA
TT&C stations:	White Sands, NM

International Gateway Earth Stations:

TDRS-AOR (formerly TDRS-4):

Auburn Teleport, Auburn, AL
Blocktown Satellite Uplink, Fabius, NY
Crescomm Transmission, Holmdel, NY
LMC Satcom, Douglasville, GA
Micronet, Glenwood, NJ
Pittsburgh International Teleport, Pittsburgh, PA
Teleport Denver, Denver, CO
Washington International Teleport, Alexandria, VA

TDRS-POR (formerly TDRS-5):

Associated Communications International,
Los Angeles, CA
MCI Telecommunications, Yacolt, WA
Teleport Denver, Denver, CO
U.S. Electrodynamics, Brewster, WA

COLUMBIA/TDRSS SYSTEM At A Glance

Satellite name: TDRSS-AOR [formerly TDRSS-4] (41°W),
TDRSS-POR [formerly TDRSS-5] (174.3°W)

Spacecraft data:

Mass (in orbit): 2,400 kg
Primary power (EOL): 1,700 W
Eclipse protection: All transponders
Stabilization: 3-axis
Launch date: March 1989 (TDRSS-AOR),
August 1991 (TDRSS-POR)
Expected lifetime: 10 years

Transponders:

Number: 12
Power output: 5.5 W TWTA
Polarization: Linear

Single carrier saturation flux density: -86.4 dBW/sq.m.

Manufacturer: TRW

TDRSS-AOR and TDRSS-POR

Orbital location: 41°W (TDRSS-AOR), 174.3°W (TDRSS-POR)

Launch: March 1989, STS/IUS (TDRSS-AOR);
August 1991, STS/IUS (TDRSS-POR)

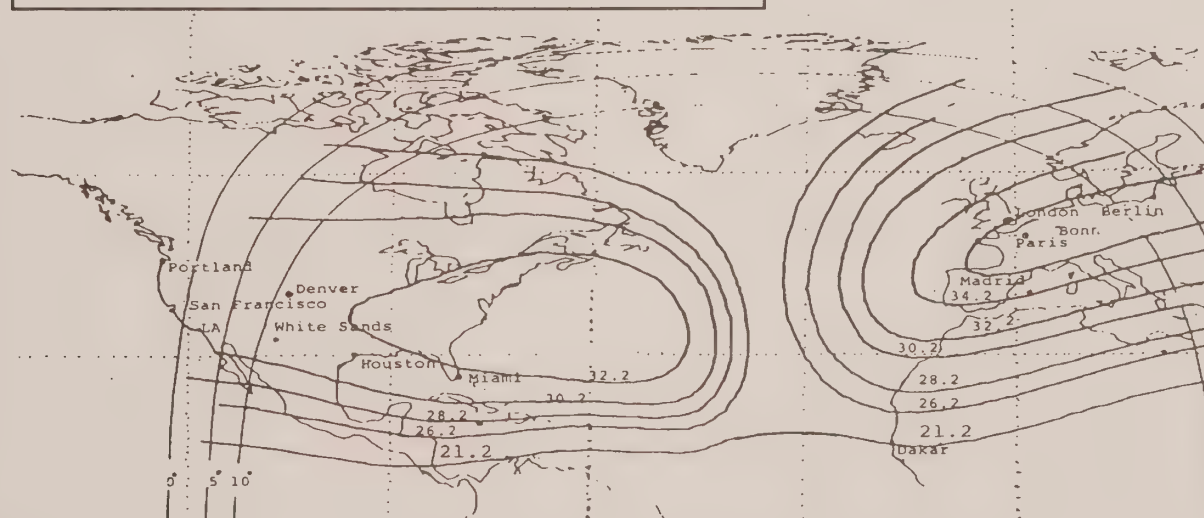
Expected lifetime: 10 years

Expected end of life: 1999 (TDRSS-AOR), 2001 (TDRSS-POR)

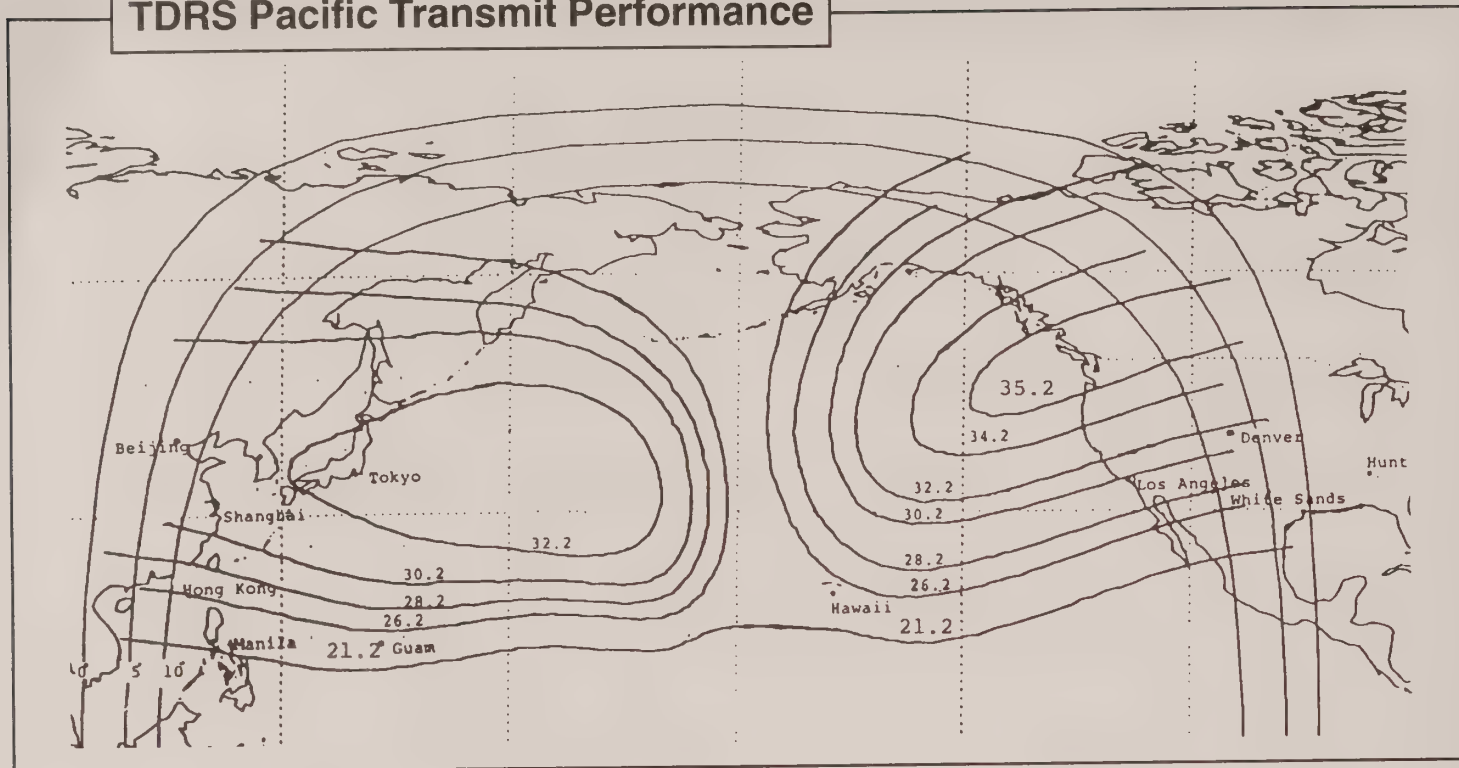
Antennas beam coverage overview:

C-band: Philippines, Hong Kong, Taiwan, China, Japan, Korea,
Russian Far East, North America, Europe, Mediterranean
and Northern Africa

TDRS Atlantic Transmit Performance



TDRS Pacific Transmit Performance



Columbia/TDRS International Satellite System Landing Rights

Europe and Middle East

Austria
 Belgium
 Bosnia-Herzegovina
 Denmark
 France
 Finland
 Germany
 Ireland
 Israel
 Liechtenstein
 Luxembourg
 Netherlands
 Portugal
 Sweden
 Switzerland
 Turkey
 United Kingdom

North America and Caribbean

Bahamas
 Canada
 Jamaica
 Mexico
 United States*

Asia

Hong Kong
 Japan**
 Korea**
 Philippines

* Columbia has also received permission from the U.S. Federal Communications Commission to carry traffic to and from Guam and other U.S. possessions in the Pacific.

** Government private-line to date.

INTELSAT

(INTERNATIONAL TELECOMMUNICATIONS SATELLITE ORGANIZATION)

3400 International Drive NW
Washington, DC 20008-3098
USA

Telephone: (202)944-6800
Facsimile: (202)944-7898
Telex: 892707

Booking Contact:

Intelsat Operations Center, (202)944-6781
Television Service Center (TVSC), (202)944-6797

Public Relations Contact:

Tony Trujillo, Manager of Public and External Relations, (202)944-7500

Overview:

Intelsat was created in 1964 to establish a global commercial communications satellite system. The space segment of the Intelsat system consists of the satellites owned and operated by Intelsat, and the ground segment is composed of earth stations owned predominantly by the designated telecommunications entity in each member country. A number of countries pay to use Intelsat's telecommunications facilities, but are not members.

Services Offered:

- Broadcasting: Occasional-use (minimum ten minutes), short-term and long-term full-time leases
- IDR: a digital public switched service compatible with evolving standards for the integrated services digital network (ISDN); used for international public switched telephony and dedicated private digital networks
- TDMA (time division multiple access): ISDN-quality services used for international public switched telephony traffic of large volume
- IBS (Intelsat Business Service) and Intelnet: private network services for end-to-end wideband digital communications; full-time, part-time and occasional-use private line service at transmission rates up to 8.448 megabits per second.

Services Offered (Continued):

- Intelnet: Intelsat's primary VSAT service
- Multi-use leases: bulk leasing capacity for telephony, data and broadcasting, including 9 through 72 MHz units for C- and Ku-band capacity and a 150 MHz option for Ku-band services on VI-series satellites

Satellite Control:

TT&C stations: Perth, Australia; Raisting, Germany; Fucino, Italy; Beijing, People's Republic of China; Clarksburg, MD, USA; Paumalu, HI, USA

Intelsat Earth Station Standards:

Earth Station Standard	Antenna Size in Meters	Types of Service	Frequency Band
A	15-18	Analog and digital public-switched, private (business) network, broadcasting	6/4
B	10-13	Analog and digital public-switched, private (business) network, broadcasting	6/4
C	11-14	Analog and digital public-switched, private (business) network, broadcasting	14/11
D1	4.5-6	Analog and digital public-switched, thin-route applications in remote areas	6/4
D2	11	Analog and digital public-switched, thin-route applications in remote areas	6/4
E1	3.5-4.5	Private (business) network	14/11 & 14/12
E2	5.5-7	Digital public-switched, private (business) network	14/11 & 14/12
E3	8-10	Digital public-switched, private (business) network	14/11 & 14/12
F1	4.5-5	Digital public-switched*, private (business) network services	6/4
F2	5.5-7	Digital public-switched, private (business) network services	6/4
F3	9-10	Analog and digital public-switched, private (business) network services	6/4
G	All sizes	International lease services	6/4, 14/11, 14/12
Z	All sizes	Domestic lease services	6/4, 14/11, 14/12

* Approved on a case-by-case basis.

Intelsat Member Countries

Country	Signatory	Investment Share %
Afghanistan	Ministry of Communications of the Democratic Republic of Afghanistan	0.050000
Algeria	Government of the Democratic and Popular Republic of Algeria	0.313078
Angola	Empresa Publica de Telecomunicacoes (Eptel)	0.127196
Argentina	Comision Nacional de Telecomunicaciones	1.311700
Armenia	Ministry of Telecommunications	0.050000
Australia	Telstra Corporation Limited	2.590409
Austria	Government of Austria	0.434773
Azerbaijan	Ministry of Communication of Azerbaijan Republic	0.050000
Bahamas	The Bahamas Telecommunications Corporation (Batelco)	0.100303
Bangladesh	Telegraph and Telephone Board of Bangladesh	0.225870
Barbados	Barbados External Telecommunications Ltd.	0.050000
Belgium	Regie des Telegraphes et des Telephones	0.734956
Benin	Office des Postes et Telecommunications de la Republique Populaire du Benin	0.050000
Bhutan	Department of Telecommunications, Ministry of Communications	0.050000
Bolivia	Empresa Nacional de Telecomunicaciones (Entel)	0.258169
Brazil	Empresa Brasileira de Telecomunicacoes S.A. (Embratel)	1.746660
Burkina Faso	Office des Postes et Telecommunications du Burkina Faso	0.060481
Cameroon	Societe des Telecommunications Internationales du Cameroun (Intelcam)	0.294247
Canada	Teleglobe Canada Inc.	2.100000
Cape Verde	C.T.T. - Empresa Publica dos Correios e Telecomunicacoes	0.050000
Central African Republic	Government of the Central African Republic	0.050000
Chad	Societe des Telecommunications Internationales du Tchad (T.I.T.)	0.050000
Chile	Empresa Nacional de Telecomunicaciones S.A. (Entel)	0.653976
China	Ministry of Posts and Telecommunications of the People's Republic of China	1.787019
Colombia	Empresa Nacional de Telecomunicaciones de Colombia (Telecom)	1.280488
Congo	Government of the People's Republic of the Congo	0.050000
Costa Rica	Instituto Costarricense de Electricidad	0.050000
Cote d'Ivoire	Government of the Republic of Cote d'Ivoire	0.199754
Croatia	Ministry of Maritime Affairs, Transport and Communications	0.050000
Cyprus	Cyprus Telecommunications Authority	0.184255
Czech Republic	Sprava Radiokomunikaci Praha, s.p.	0.050000
Denmark	Tele Danmark A/S	0.588640
Dominican Republic	Compania Dominicana de Telefonos, C. por A.	0.289206
Ecuador	Instituto Ecuatoriano de Telecomunicaciones (Ietel)	0.392615
Egypt	Government of the Arab Republic of Egypt	0.648345
El Salvador	Administracion Nacional de Telecomunicaciones (Antel)	0.059795
Ethiopia	Telecommunications Service, Provisional Military Government of Socialist Ethiopia	0.159336
Fiji	Fiji International Telecommunications Limited (Fintel)	0.050000
Finland	General Directorate of Posts and Telecommunications of Finland	0.149937
France	France Telecom	3.676680
Gabon	Societe des Telecommunications Internationales Gabonaises (T.I.G.)	0.060000
Germany	Federal Ministry for Post and Telecommunication	4.191452
Ghana	Ministry of Transport and Communications	0.100000

Intelsat Member Countries (Continued)

Country	Signatory	Investment Share %
Greece	Hellenic Telecommunications Organization (OTE) S.A.	0.627090
Guatemala	Empresa Guatemalteca de Telecomunicaciones (Guatel)	0.329856
Guinea	Secretariat d'Etat aux Postes et Telecomunicaciones	0.059787
Haiti	Telecommunications d'Haiti S.A.	0.141063
Honduras	Empresa Hondurena de Telecomunicaciones (Hondutel)	0.050000
Iceland	Government of Iceland	0.171600
India	Videsh Sanchar Nigam Limited	2.070837
Indonesia	PT Indosat	0.600000
Iran	Telecommunication Company of Iran	0.883984
Iraq	Government of the Republic of Iraq	0.246232
Ireland	The Irish Telecommunications Board	0.199592
Israel	The Israel Telecommunication Corporation Ltd. (Bezeq)	0.490702
Italy	Societa Telespazio	2.800000
Jamaica	Jamaica International Telecommunications Limited (Jamintel)	0.355349
Japan	Kokusai Denshin Denwa Company Ltd.	4.493748
Jordan	Government of the Hashemite Kingdom of Jordan	0.279436
Kenya	Kenya Posts and Telecommunications Corporation	0.328273
Korea, Republic of	Korea Telecom	1.419335
Kuwait	The Ministry of Communications, The State of Kuwait	0.845049
Lebanon	Government of Lebanon	0.050000
Libya	Government of the Great Socialist People's Libyan Arab Jamahiriya	0.148460
Liechtenstein	Government of the Principality of Liechtenstein	0.050000
Luxembourg	Government of Luxembourg	0.050000
Madagascar	Societe des Telecommunications Internationales de la Republique Malgache (Stimad)	0.050000
Malawi	The Department of Posts and Telecommunications of the Government of the Republic of Malawi	0.112127
Malaysia	Syarikat Telekom Malaysia Berhad	0.648763
Mali	Telecommunications Internationales du Mali (T.I.M.)	0.093769
Mauritania	Government of the Islamic Republic of Mauritania	0.050000
Mauritius	Mauritius Telecom Limited	0.145638
Mexico	Government of Mexico	0.744306
Monaco	Government of the Principality of Monaco	0.050000
Morocco	Office National des Postes et Telecomunicaciones	0.164969
Mozambique	Empresa Nacional de Telecomunicacoes de Mocambique	0.082833
Nepal	Nepal Telecommunications Corporation	0.067002
Netherlands	PTT Nederland NV	1.217516
New Zealand	Telecom Corporation of New Zealand Ltd.	0.660033
Nicaragua	Instituto Nicaraguense de Telecomunicaciones y Correos (Telcor)	0.054408
Niger	Government of the Republic of Niger	0.050000
Nigeria	Nigerian External Telecommunications Limited	0.683433
Norway	Norwegian Telecom (Televerket)	1.139706
Oman	Sultanate of Oman	0.207807
Pakistan	Government of the Islamic Republic of Pakistan	1.000000
Panama	Instituto Nacional de Telecomunicaciones (Intel)	0.050000
Papua New Guinea	Posts and Telecommunication Corporation of Papua New Guinea	0.050000
Paraguay	Administracion Nacional de Telecomunicaciones (Antelco)	0.176796

Intelsat Member Countries (Continued)

Country	Signatory	Investment Share %
Peru	Empresa Nacional de Telecomunicaciones del Peru (Entel Peru)	1.035469
Philippines	Philippine Communications Satellite Corporation (Philcomsat)	0.639941
Portugal	Companhia Portuguesa Radio Marconi	0.640850
Qatar	Qatar Public Telecommunications Corporation (Q-Tel)	0.266322
Romania	Ministry of Posts and Telecommunications of Romania	0.050000
Russian Federation	Ministry of Communications of the Russian Federation	0.055641
Rwanda	Ministere des Transports et des Communications de la Republique Rwandais	0.050000
Saudi Arabia	Government of Saudi Arabia	1.649475
Senegal	Government of the Republic of Senegal	0.119272
Singapore	Singapore Telecommunications Private Limited	1.960000
Somalia	Ministry of Posts and Telecommunications of the Somali Democratic Republic	0.050000
South Africa	Telkom SA Ltd.	1.178211
Spain	Telefonica de Espana, S.A.	3.090982
Sri Lanka	Government of Sri Lanka	0.075000
Sudan	Government of the Democratic Republic of the Sudan	0.119479
Swaziland	Posts and Telecommunications Corporation (Public)	0.050000
Sweden	Swedish Telecom	0.628507
Switzerland	Direction Generale de l'Entreprise des Postes, Telephones et Telegraphes Suisses	0.876388
Syria	Government of the Syrian Arab Republic	0.154613
Tanzania	Tanzania Posts and Telecommunications Corporation	0.100284
Thailand	Government of Thailand	1.175881
Togo	Office des Postes et Telecommunications du Togo (OPTT)	0.141370
Trinidad and Tobago	Telecommunications Services of Trinidad & Tobago Limited (TSTT)	0.050000
Tunisia	Administration for Post, Telegraph and Telephone of Tunisia	0.050000
Turkey	Government of Turkey	0.050000
Uganda	Ministry of Power, Post and Telecommunications of the Government of the Republic of Uganda	0.066560
United Arab Emirates	Ministry of Communications of the Government of the United Arab Emirates	11.595259
United Kingdom	British Telecommunications Public Limited Company	20.996558
United States of America	Communications Satellite Corporation (Comsat)	21.864515
Uruguay	Administracion Nacional de Telecomunicaciones	0.050000
Vatican City State	Government of the Vatican City State	0.050000
Venezuela	Venezuelan Telephone Company (Compania Anonima Nacional Telefonos de Venezuela)	0.983370
Vietnam	Direction Generale des Postes et Telecommunications de la Republique Socialiste du Viet Nam	0.050000
Yemen	Government of the Republic of Yemen	0.186703
Yugoslavia	Community of the Yugoslav Posts, Telegraphs and Telephones	0.266760
Zaire	Office National des Postes et Telecommunications du Zaire (O.N.P.T.Z.)	0.153442
Zambia	Government of the Republic of Zambia	0.118475
Zimbabwe	Government of Zimbabwe	0.050000

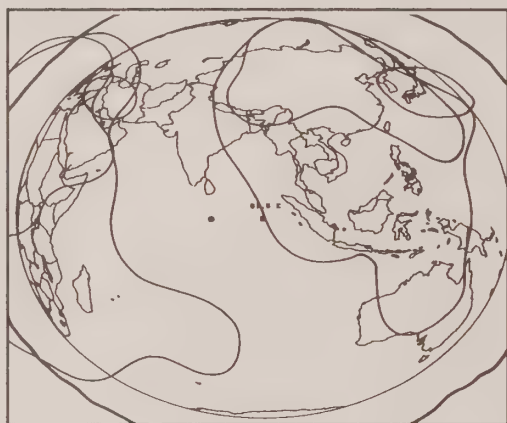
INTELSAT 5 SYSTEM At A Glance

Satellite name:	Intelsat 501 (91.5°E); Intelsat 503 (177°W); Intelsat 505 (66°E); Intelsat 507 (57°E); Intelsat 508 (180°E) (All are in inclined orbits)
Spacecraft data:	
Mass (in orbit):	1,020-1,090 kg
Stabilization:	3-axis
Primary power (EOL):	1,300 W
Launch date:	May 1981 (501); December 1981 (503); September 1982 (505); October 1983 (507); March 1984 (508)
Design lifetime:	7 years (exceeded)
Launch vehicle:	Atlas/Centaur (501 to 506); Ariane (507-508)
Transponders:	
Number:	5 C-band @ 36 MHz; 16 C-band @ 72 MHz; 4 Ku-band @ 72 MHz; 2 Ku-band @ 241 MHz
Power output:	8.5 and 4.5 W (C-band global and hemispheric), 4.5 W TWTA (C-band zonal); 10 W TWTA (Ku-band spot)
Polarization:	Circular (C-band), Linear (Ku-band)
Uplink frequency:	5.929-6.425 GHz (C-band), 14.004-14.498 GHz (Ku-band)
Downlink frequency:	3.704-4.198 GHz (C-band), 10.954-11.698 GHz (Ku-band)
Single carrier saturation flux density:	-67.5 to -85.1 dBW/sq.m. (C-band global); -64.5 to -82.1 dBW/sq.m. (C-band hemispheric and zonal); -72.0 to -77.0 dBW/sq.m. (Ku-band east spot); -75.3 to -80.3 dBW/sq.m. (Ku-band west spot)
Manufacturer:	Space Systems/Loral (Ford Aerospace at time of manufacture)

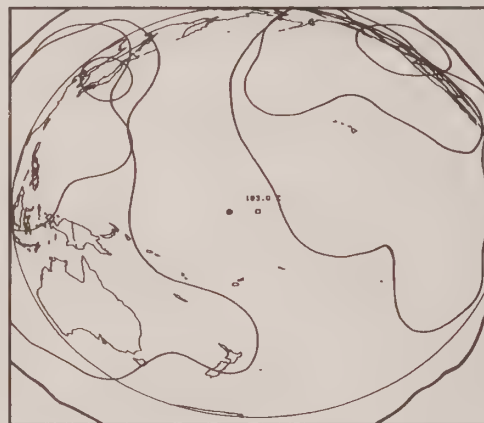
Intelsat 5

Orbital location: 91.5°E (501); 177°W (503); 66°E (505); 57°E (507);
180°E (508)

Intelsat 501 EIRP



Intelsat 503 EIRP



INTELSAT 501, 503 Nominal Beam Edge Contours Illustrated	
Beam	EIRP (dBW)
Global (A Pol)	23.5
East/West Hemispheric	29.0
East/West Atlantic Zone	29.0
West Spot Ku-Band	44.4
East Spot Ku-Band	41.1

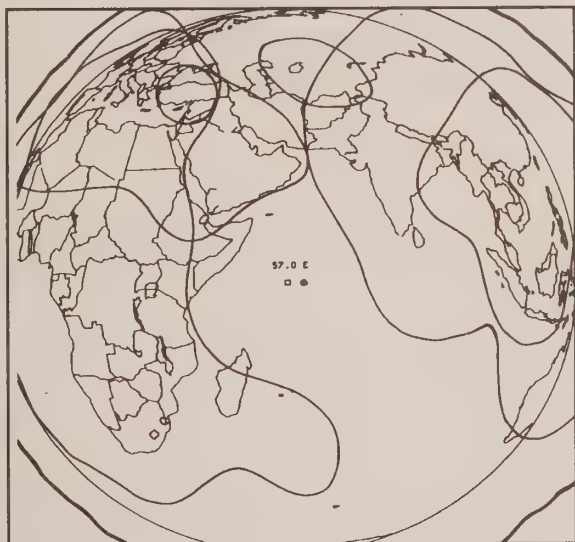
Intelsat 505 EIRP



INTELSAT
505, 507, 508
Nominal Beam Edge Contours Illustrated

Beam	EIRP (dBW)
Global (A Pol)	23.5
East/West Hemispheric	29.0
East/West Atlantic Zone	29.0
West Spot Ku-Band	44.4
East Spot Ku-Band	41.1

Intelsat 507 EIRP



Intelsat 508 EIRP



INTELSAT 5A SYSTEM At A Glance

Satellite name: Intelsat 510 (174°W), Intelsat 511 (177°E)

Mass (in orbit): 1,160 kg

Stabilization: 3-axis

Primary power (EOL): 1,300 W

Launch date: March 1985 (510); June 1985 (511)

Design lifetime: 7 years

Launch vehicle: Atlas/Centaur

Transponders:

Number: 16 C-band @ 36 MHz;

4 Ku-band @ 72 MHz;

2 Ku-band @ 241 MHz;

10 C-band @ 72 MHz

Power output: 8.5 and 4.5 W TWTAs

(C-band spot, hemispherical and global);

4.5 W TWTAs (C-band zonal);

10 W TWTAs (Ku-band)

Polarization: Circular (C-band), linear (Ku-band)

Uplink frequency: 5.929-6.423 GHz (C-band),

14.004-14.498 GHz (Ku-band)

Downlink frequency: 3.704-4.198 GHz (C-band),

10.954-11.698 GHz (Ku-band)

Single carrier saturation flux density: -70.1 to -85.1 dBW/sq.m.

(C-band global and spot);

-67.1 to -84.1 dBW/sq.m.

(C-band hemispherical and zonal);

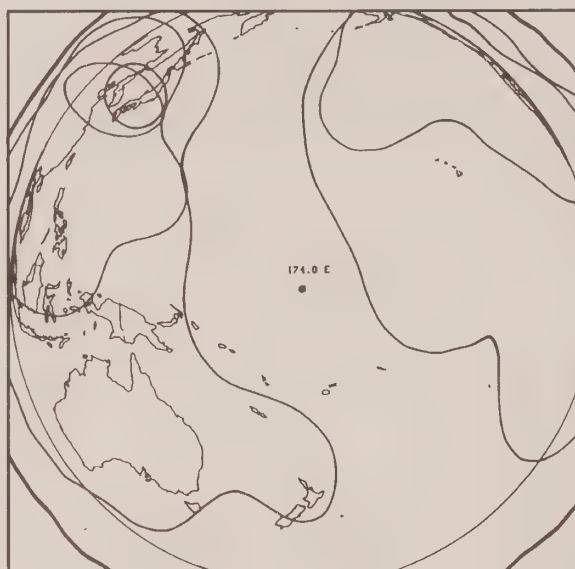
-72 to -84 dBW/sq.m. (Ku-band spot)

Manufacturer: Space Systems/Loral

Intelsat 5A

Orbital location: 174°W (510), 177°E (511)

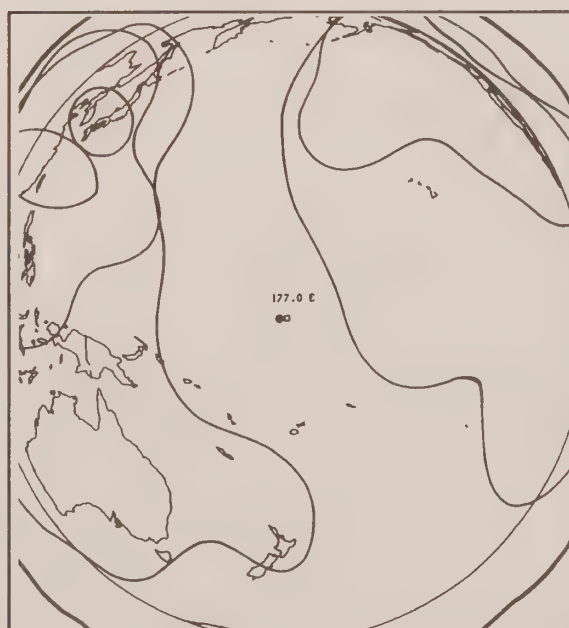
Intelsat 510 EIRP



INTELSAT
510, 511
Nominal Beam Edge Contours Illustrated

Beam	EIRP (dBW)
Global (A Pol)	23.5
East/West Hemispheric	29.0
East/West Atlantic Zone	29.0
West Spot Ku-Band	44.4
East Spot Ku-Band	41.1

Intelsat 511 EIRP



INTELSAT 6 SYSTEM At A Glance

Satellite name: Intelsat 602 (63°E), Intelsat 604 (60°E)

Spacecraft data:

Mass (in orbit): 1,160 kg
 Stabilization: Spin
 Primary power (EOL): 2,252 W
 Launch date: October 1989 (602); June 1990 (604)
 Expected lifetime: 10 years
 Launch vehicle: Ariane (602); Titan III (604)

Transponders:

Number: 26 C-band @ 72 MHz;
 12 C-band @ 36 MHz;
 2 C-band @ 41 MHz;
 6 Ku-band @ 72 MHz;
 2 Ku-band @ 77 MHz;
 2 Ku-band @ 150 MHz
 Power output: 10 and 13.5 W TWTA (C-band global);
 16 and 10 W TWTA
 (C-band hemispheric);
 1.8, 3.2, 5.5 and 10 W TWTA
 (C-band zonal);
 20 and 40 W TWTA (Ku-band spot)
 Polarization: Circular (C-band), Linear (Ku-band)
 Uplink frequency: 5.850-6.425GHz (C-band),
 14.004-14.498 GHz (Ku-band)
 Downlink frequency: 3.625-4.198 GHz (C-band),
 10.954-11.698 GHz (Ku-band)

Single carrier saturation flux density: -70.1 to -82.1 dBW/sq.m. (C-band global);
 -67.1 to -77.6 dBW/sq.m.
 (C-band hemispheric and zonal);
 -72.2 to -84 dBW/sq.m. (Ku-band spot)
 G/T: -14 dB/K (C-band global);
 -9.5/-9.2 dB/K (C-band hemispheric);
 -3/-2 dB/K (C-band zonal, NW & NE);
 -7.5/-7 dB/K (SW & SE)

Manufacturer: Hughes Aircraft Company

Intelsat 6

Orbital location: 63°E (602), 60°E (604)

Intelsat 602 EIRP



Intelsat 604 EIRP



INTELSAT
602, 604
Nominal Beam Edge Contours Illustrated

Beam	EIRP (dBW)
Global (A & B Pol)	26.5
East/West Hemispheric	31.0
NE, SE, NW, SW Atlantic Zone	31.0
West Spot Ku-Band	44.7 (1)
	44.7 (0)
East Spot Ku-Band	44.7

INTELSAT K SYSTEM At A Glance

Satellite name: Intelsat K (21.5°W)

Spacecraft data

Mass (at launch): 1,473 kg
Stabilization: Body-stabilized
Primary power (EOL): 3,155 W
Launch date: June 1992
Design lifetime: 10 years
Launch vehicle: Atlas IIA

Transponders:

Number: 16 @ 54 MHz
Power output: 60 W TWTA
Polarization: Linear
Uplink frequency: 11.45-11.70 GHz
Downlink frequency: 14.0-14.5 GHz

Redundancy:

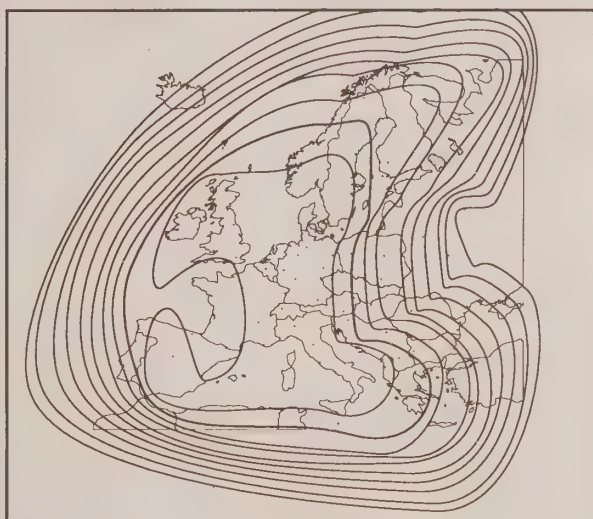
Transponders: 2:1
TWTA: 11:8

Manufacturer: Martin Marietta Astrospace
(GE Astrospace at time of manufacture)

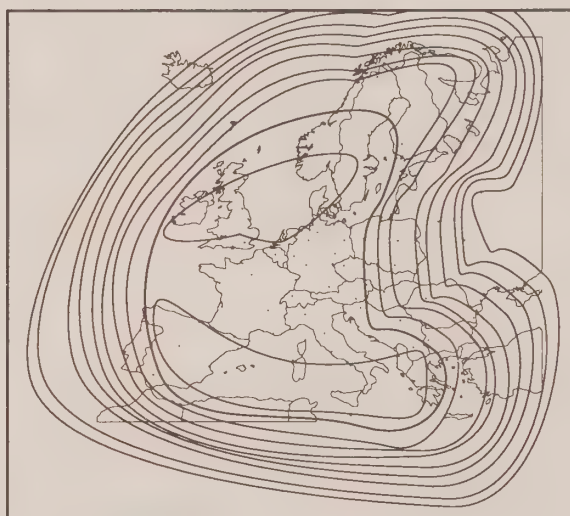
Intelsat K

Orbital location: 21.5°W

Intelsat K European Vertical
Beam EIRP*



Intelsat K European Horizontal
Beam EIRP*



INTELSAT
K
Nominal Beam Edge Contours Illustrated

Beam	EIRP (dBW)
North American Horizontal	47.5
South America Vertical	47.0
European Horizontal & Vertical	47.0

* Predicted Transmit Coverage

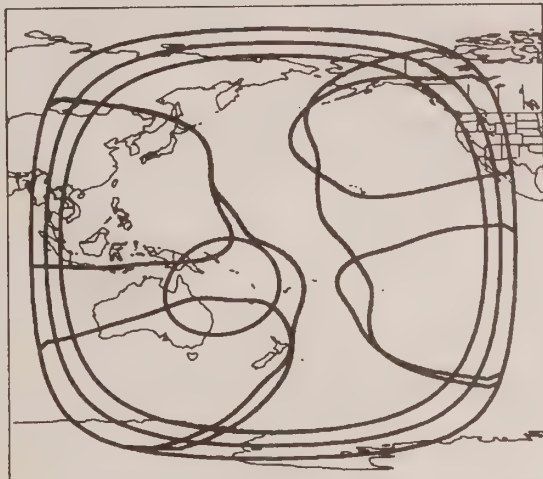
INTELSAT 7 SYSTEM At A Glance

Satellite name:	Intelsat 701 (174°E); Intelsat 702 (177°W); Intelsat 704 (66°E)
Spacecraft data:	
Mass (at launch):	1,470 kg
Stabilization:	
Launch date:	October 1993 (701); March 1994 (702); October 1994 (704)
Expected lifetime:	10 years
Launch vehicle:	Ariane (701, 702, 709), Atlas IIAS (703-705)
Transponders:	
Number:	26 C-band @ 34, 36, 41, 72 and 77 MHz; 10 Ku-band @ 34, 72, 77 and 112 MHz
Power output:	10, 16, 20 and 30 W SSPA (C-band), 35 and 50 W TWTA (Ku-band)
Single carrier saturation flux density:	-87 to -73 dBW/sq.m.
G/T:	-12 dB/K (C-band global); -5 dB/K (C-band spot); -8.7/-8.5 to -7.5 dB/K (C-band hemispheric); -9.2 to -4 dB/K (C-band zonal)
Manufacturer:	Space Systems/Loral

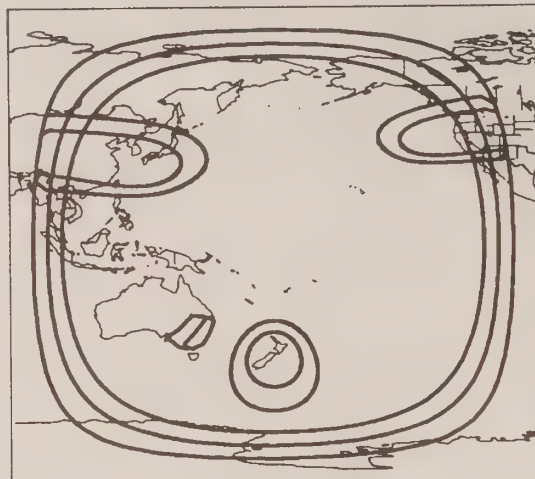
Intelsat 7

Orbital location: 174°E (701), 177°E (702)

Intelsat 701 EIRP

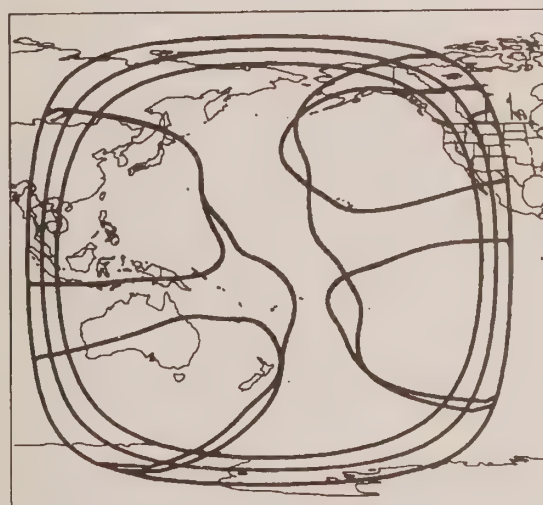


C-band coverage

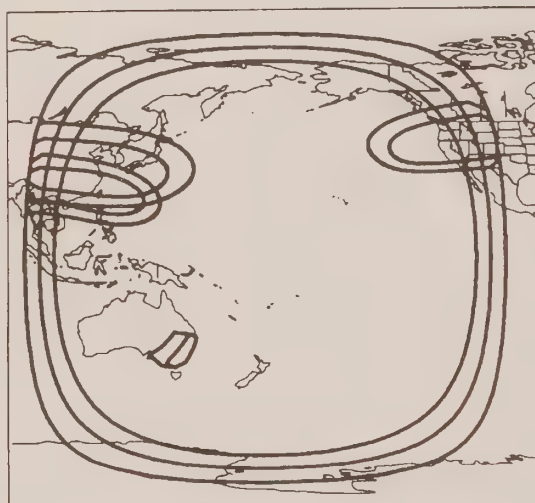


Ku-band coverage

Intelsat 702 EIRP



C-band coverage

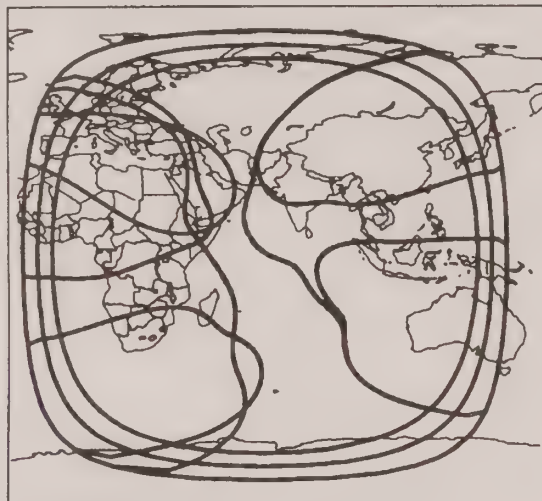


Ku-band coverage

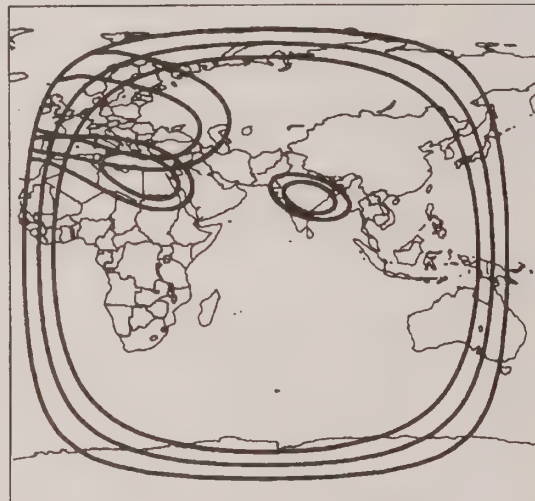
INTELSAT 701, 702

Beam	EIRP (dBW)
Global	26/29
Hemispheric/Zonal	33
C-Band Spot	33/36
Ku-Band Spot	46

Intelsat 704 EIRP



C-band coverage



Ku-band coverage

INTELSAT 704	
Beam	EIRP (dBW)
Global	26/29
Hemispheric/Zonal	33
C-Band Spot	33/36
Ku-Band Spot	46

PANAMSAT

One Pickwick Plaza
Greenwich, CT 06830
USA

Telephone: (203)622-6664
Facsimile: (203)622-9163

Booking Contact:

24-hour video booking service: (203)622-8704
Homestead International Gateway Teleport, 143 Flagler Avenue, Homestead, FL 33031
(305)247-7055; Facsimile: (305)245-3720

Public Relations Contact:

Elizabeth Dickins, Director of Public Relations

Overview:

PanAmSat, a private, international satellite communications company, currently operates the PAS-1 satellite, providing services to customers throughout Latin America, Europe, the Caribbean, and the United States. PanAmSat is expanding to provide global services with the launch of PAS-2 over the Pacific Ocean region in May 1994, followed by the launch of PAS-3 for services over the Atlantic Ocean region in November 1994. The PAS-4 satellite over the Indian Ocean region will complete worldwide coverage in February 1995.

Services Offered:

- Full turnkey services
- Full-time broadcast, radio, program syndication, SNG, special events
- Point-to-point data circuits, point-to-multipoint video and interactive VSATs (64 kbps to T-1 circuits)
- Business television, program feeds, full-and part-time transmission, point-to-multipoint video, videoconferencing, broadcast radio

Satellite Control Network:

Satellite control:	Homestead, FL
TT&C stations:	Atlanta, GA

International Gateway Earth Stations:

Homestead, FL, Australia, California, and Europe

PAS-2 SYSTEM At A Glance

Satellite name: PAS-2 (191°W)

Spacecraft data:

Launch date: May 1994

Expected lifetime: 15 years

Beam configuration: Beam-shaped regional and spot beams

Transponders:

Number: 16 Ku-band (8H, 8V); 16 C-band (8H, 8V)

Power Output: 63 W (Ku-band); 30 W (C-band)

Manufacturer: Hughes

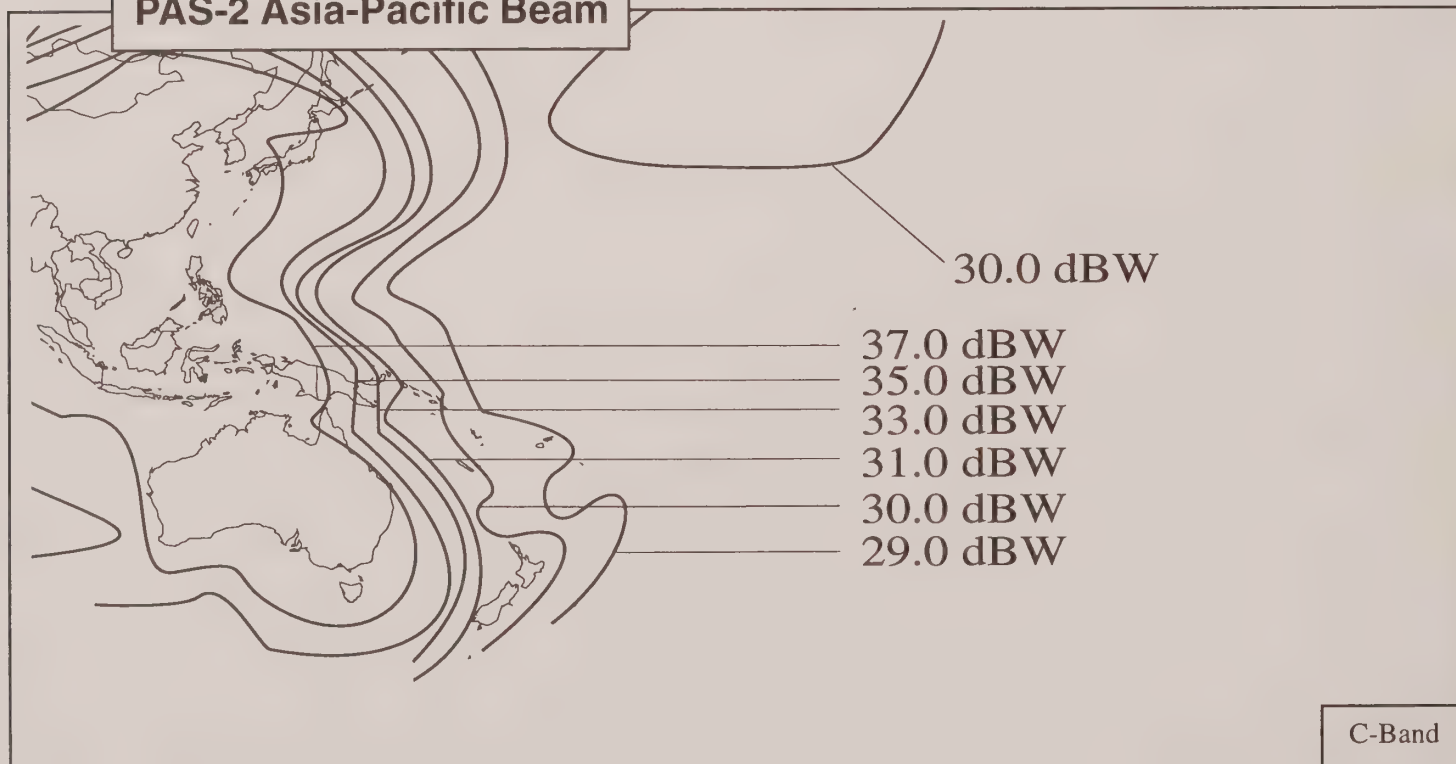
PAS-2

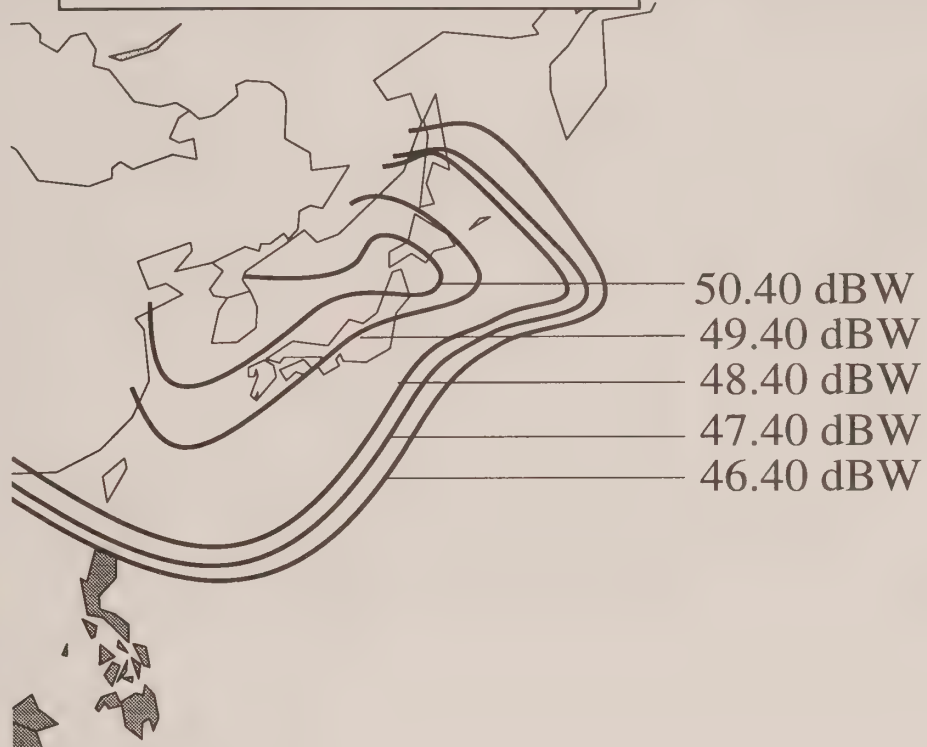
Orbital location:	191°W
Launch:	May 1994
Expected lifetime:	15 years
Expected end of life:	2009

Antennas beam coverage overview:

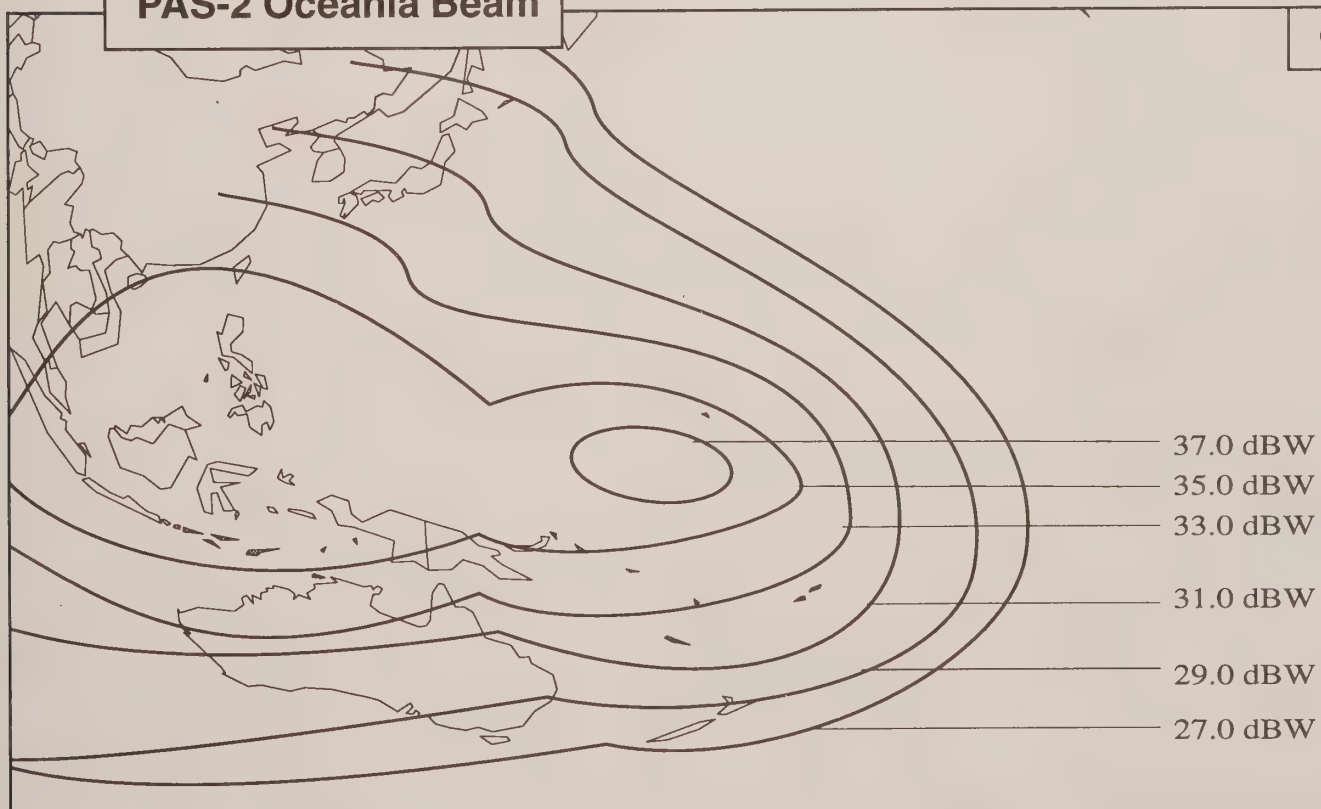
C-band:	Asia-Pacific, Oceania
Ku-band:	Northeast Asia, China, Australia, New Zealand

PAS-2 Asia-Pacific Beam



PAS-2 Northeast Asia Beam

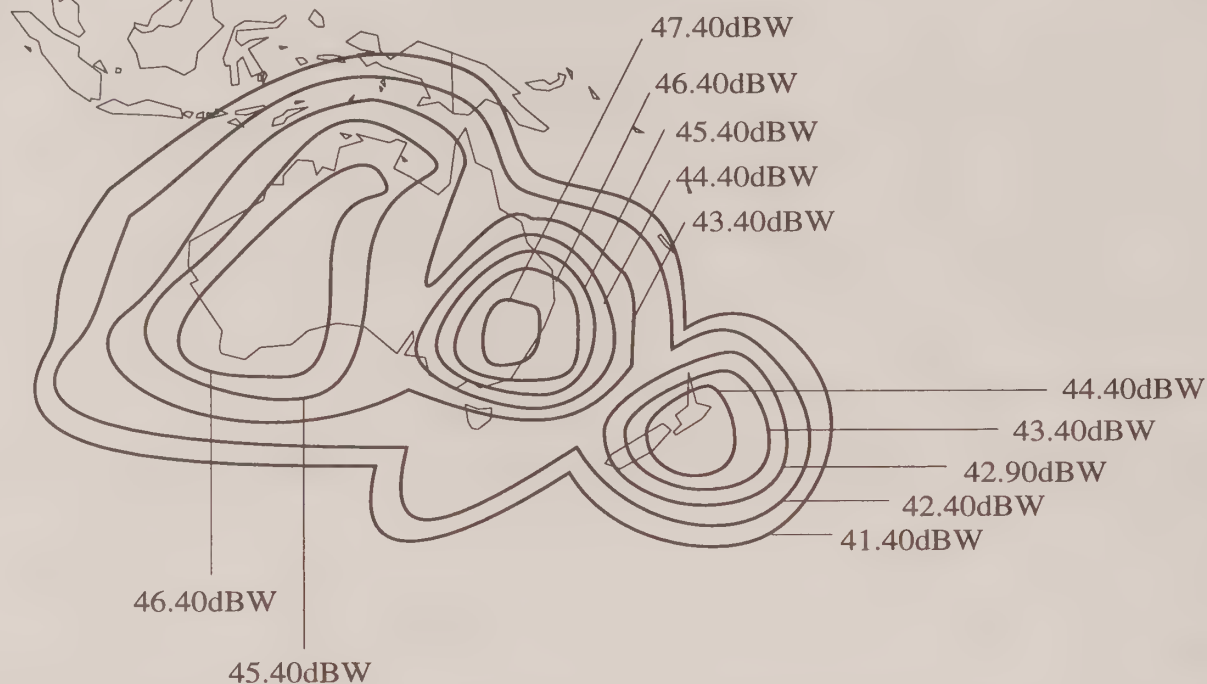
Ku-band

PAS-2 Oceania Beam

C-band

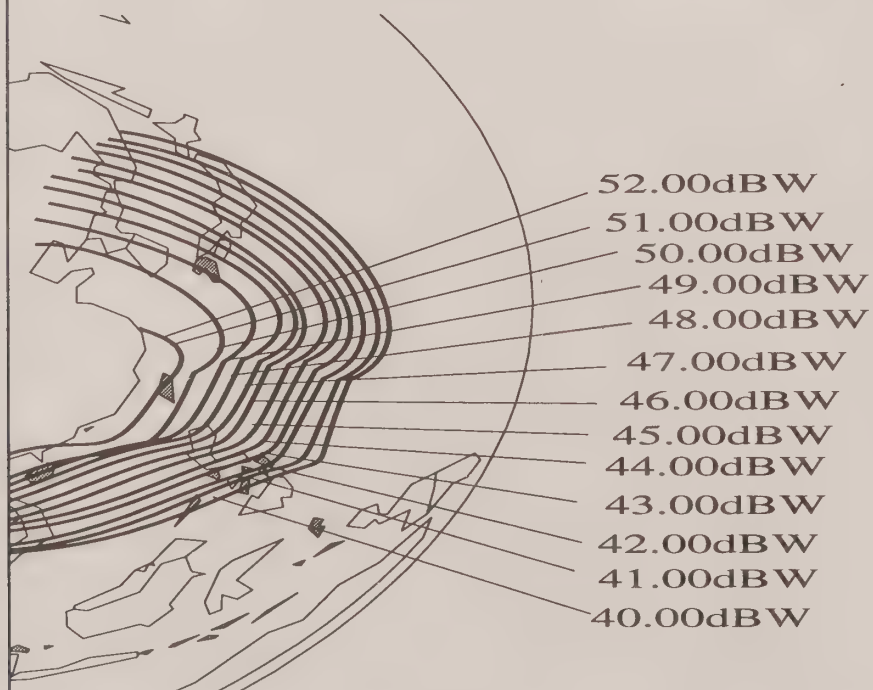
PAS-2 Australia/New Zealand Beam

Ku-band



PAS-2 China Beam

Ku-band



RIMSAT LTD.

6920 Pointe Inverness Way
Suite 150
Fort Wayne, IN 46804
USA

Telephone: (219)436-3800
Facsimile: (219)436-9669

Contact:

Jim Simon, Managing Director
Mike Sternberg, Chief Operating Officer

Overview:

Rimsat has contracted with a Russian agency to build, launch and lease seven geostationary satellites that will use three slots obtained from Tongasat at 130°E, 134°E and 142°E. Rimsat's first satellite, a Gorizont, arrived at 134°E on July 22, 1993.

RIMSAT SYSTEM At A Glance

Satellite name: Rimsat 1, "Tongastar 1"
 (a relocated Gorizont at 134°E);
 Rimsat 2 (a new Gorizont at 130°E);
 Rimsat 3 (a new Gorizont at 142.5°E);
 Rimsat 4,5,6,7 (new Express satellites,
 orbital location to be determined)

Spacecraft data:

Launch date: 1993 (Rimsat 1 and 2);
 March 1994 (Rimsat 3);
 October 1994 (Rimsat 4);
 June 1995 (Rimsat 5);
 1995 (Rimsat 6);
 1996 (Rimsat 7)

Transponders:

Number: Gorizont: 6 C-band,
 1 Ku-band (Rimsat 1 and 2);
 Express: 10 C-band, 2 Ku-band (Rimsat 3-7)

Bandwidth: 34 MHz

EIRP: 45 dBW (C-band), 38 dBW (Ku-band)

Manufacturer: NPO-PM

Rimsat

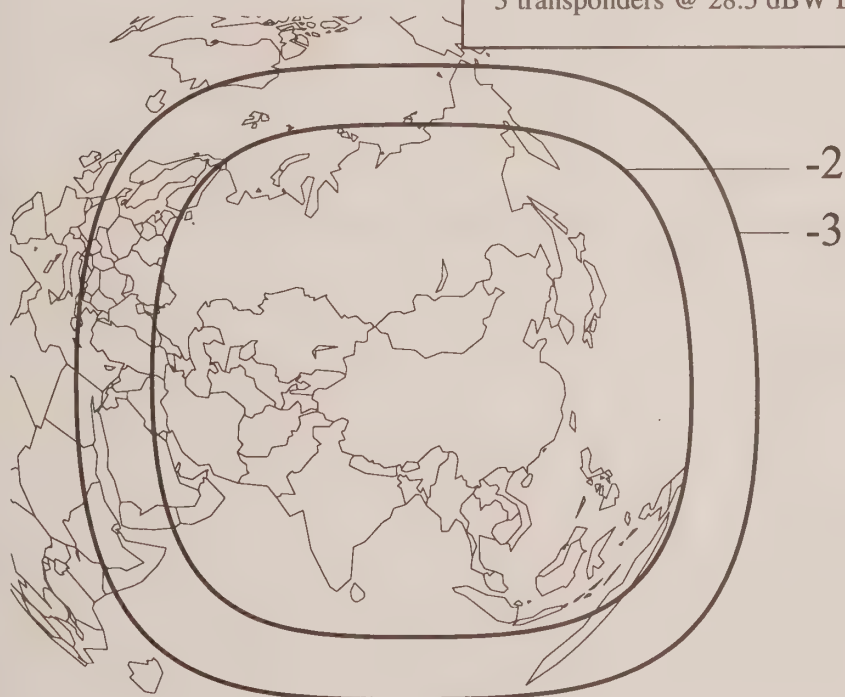
Orbital location: 134°E (Rimsat 1); 130°E (Rimsat 2); 142.5°E (Rimsat 3);
TBD (Rimsat 4, Rimsat 5, Rimsat 6, Rimsat 7)
Launch: 1993 (Rimsat 1, Rimsat 2); March 1994 (Rimsat 3);
October 1994 (Rimsat 4); June 1995 (Rimsat 5);
1995 (Rimsat 6); 1996 (Rimsat 7)

Antennas beam coverage overview:

Ku-band; C-band: Asia

Rimsat EIRP

130° Global beam
3 transponders @ 28.5 dBW EIRP



TRW SPACE & --- --- ELECTRONICS GROUP

One Space Park
Redondo Beach, CA 90278
USA

Telephone: (310)814-8888
Facsimile: (310)814-1400

Booking Contacts:

Joseph Del Riogo, Commercial/International Business Development

Overview:

The FCC has granted TRW Inc. conditional authority to construct, launch and operate the Pacificom satellite system. The satellite will provide fixed satellite service ideally suited for VSAT applications to western North America, Asia and the South Pacific countries, including Australia and New Zealand.

Proposed Services:

- Video
- Voice
- Data
- Two-way video conferencing
- Facsimile

PACIFICOM SYSTEM At A Glance

Satellite name: Pacificom (172°E)
 Spacecraft data:
 Area of coverage: Western Conus, Asia (Ku-band);
 Asia, South Pacific and Western
 North America (C-band)
 Mass (BOL): 2,123 lbs.
 Primary power (EOL): 2,400 W
 Stabilization: 3-axis
 Expected lifetime: 12 years

 Transponders:
 Number: 11 Ku-band; 8 C-band
 Power output: 10 @ 30 W TWTA,
 1 @ 55 W TWTA (Ku-band);
 30 W TWTA (C-band)
 Polarization: RHCP (Ku-band); linear (C-band)
 Uplink frequency: 14.0-14.5 GHz (Asia, Western Conus);
 5.925-6.425 GHz (all areas)
 Downlink frequency: 12.2-12.7 GHz (Asia);
 11.7-12.2 GHz (Western Conus);
 3.7-4.2 GHz (all areas)
 EIRP: 56.5 dBW (Asia, Ku-band);
 52.2 dBW (Western Conus, Ku-band);
 37.7 dBW (C-band)

 Manufacturer: TRW Space & Electronics Group

UNICOM SATELLITE CORPORATION

P.O. Box 3057
Aspen, CO 81612
USA

Telephone: (303)920-2400
Facsimile: (303)920-2426

Contacts:

Steve Collin, President
Andre Schwegler, Vice President of Marketing and Sales
Trevor Collins, Director of Asian Sales
John Parker, Manager of Technical Support

Overview:

Unicom has entered into an agreement with the Kingdom of Tonga granting access rights to own orbital positions registered by Tonga with the ITU. Unicom has signed a contract to purchase two satellites from Fairchild Space and Defense.

Proposed Services :

- Videoconferencing
- Telemetry
- Video
- Data

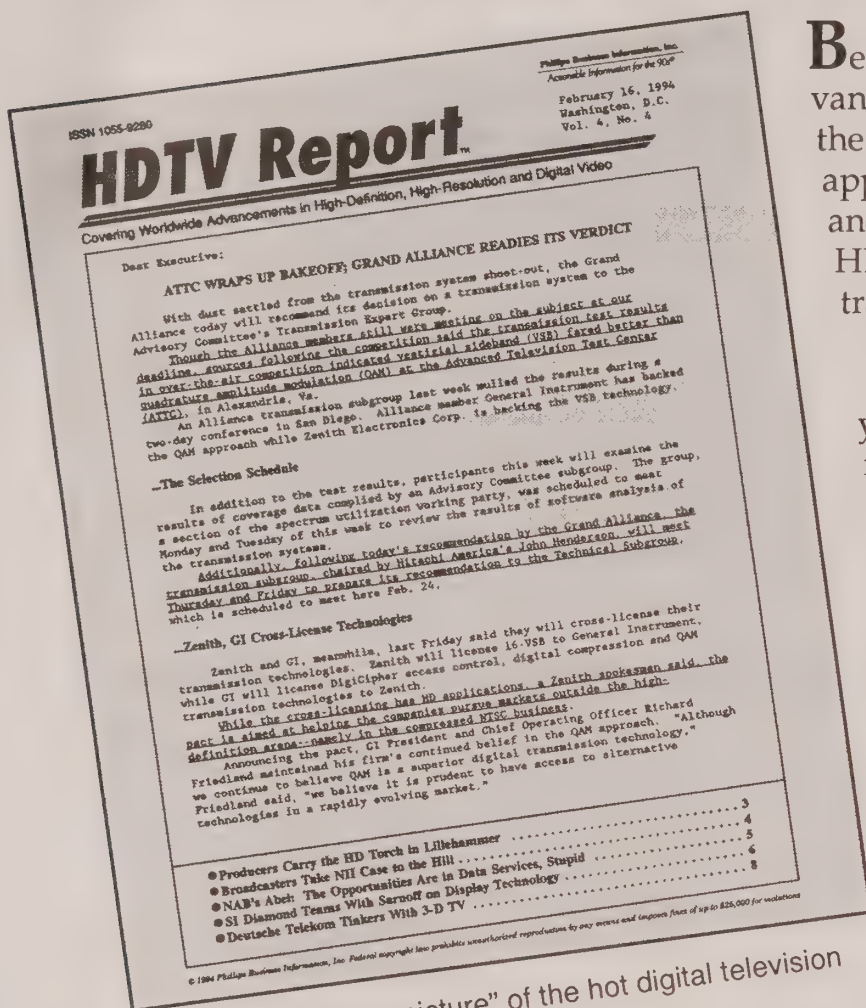
UNICOM SYSTEM At A Glance

Satellite name: Unicom 1 and 2 (70°E and 170.5°E)
Spacecraft data:
 Area of coverage: From the U.S. West Coast to
 Asian capitals (Unicom 1);
 over the Indian Ocean linking Asia
 to Europe (Unicom 2)
 Launch date: 1994-1995

Transponders:
 Number: 12 C-band @ 36 MHz;
 6 Ku-band @ 76 MHz
 Power output: 20 W SSPA (C-band); 50 W TWTA (Ku-band)
 Polarization: Linear
 EIRP: 40 dBW (C-band); 45 dBW (Ku-band)

 Manufacturer: Fairchild Space and Defense Corporation

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Priority Code: PXIAPD

SECTION 5

EQUIPMENT & SUPPORT SERVICES

Included in This Section:

This section contains an A-to-Z listing of suppliers of equipment and support services in the Asia-Pacific region. Typical companies listed in this section include manufacturers and distributors of satellite communications ground and space segment products — from components to complete systems. Also listed are organizations that serve as satellite communications business resources, including consultants, attorneys, financial institutions, insurance brokers, publishers, trade associations, etc. In addition, technical services such as launch systems, interface analysis, network design, engineering, and installation and maintenance services are represented.

Entries are listed alphabetically by company and typically include:

1. Company name, address and telephone and fax numbers;
2. Year established, number of employees and geographic area served;
3. Estimated 1993 revenue;
4. Listing of key personnel;
5. Summary of products or services offered.

How to Use This Section:

To quickly locate suppliers of a specific product or service, refer to the Product/Service Yellow Pages at the end of the Directory.

EQUIPMENT & SUPPORT SERVICES

ADC TELECOMMUNICATIONS

10 Anson Road, Hex 24-06 International Plaza
Singapore, 0207 SINGAPORE
225-8228; fax: 224-5778

■ William J. Cadogan, President; Jeffrey Wetherall, International Sales Manager; Nicholas C. Stanley, International Sales Manager

■ Manufactures circuit management devices, transmission products and network service assurance systems. Engineer, furnish and installation service available.

ADITRON PTE. LTD.

10 Jalan Besar #09-01, Sim Lim Tower
Singapore, 0820 SINGAPORE
298-3777; fax: 298-8077

■ Distributes SMATV, CATV and TVRO equipment and accessories.

ADTECH INC.

1814 Algaroba Street
Honolulu, HI 96826 USA

(808)941-0708; fax: (808)946-1300
Year established: 1967; 25 employees; 1993 projected revenues: \$3,000,000; area served: international; ownership: private

■ K. Weldon, President; C. Uyehara, Marketing Director; M. Gouveia, Sales Director; M. Holtzmann, Purchasing Agent

■ Distributes satellite data link simulators, ATM analyzers and ATM data generators.

ADVANTEST CORPORATION

150 Beach Road, #01-00 Gateway West
Singapore, 0718 SINGAPORE
299-4268; fax: 299-4226

■ I. Kitaoka, Managing Director; M. Nakahara, International Instrument Sales & Marketing Manager

■ Provides measuring instruments, including spectrum analyzers, digital multimeters, network analyzers, electronic counters, digital spectrum analyzers, optical measuring instruments, digital network measuring instruments, electrometers, scanners and plotters, ROM/PLD programmers, and DC voltage/current sources. Provides engineering, furnishing and installation services.

AL TAI SAT

P.O. Box 6100, Mansor
Baghdad, 12605 IRAQ
1-541-1277

■ Saad Al Tai, General Manager; Aqil Ajina, Head of Sales Department

■ Provides TVRO products and systems (feedhorns, LNBs and receivers), mobile systems (GPS and Inmarsat); technical consulting.

ALCATEL AUSTRALIA LTD

252-280 Botany Road
Alexandria, NSW 2015 AUSTRALIA
(2)699-0044; fax: (2)690-5111

■ G. Page-Hanify, President; M. Lamb, Government and International Manager; S. E. Bell, Marketing Director; R. J. Spithill, General Manager

■ Provides digital telephone exchanges, telephones and transmission equipment, digital cellular mobile communications systems, optical undersea cable systems, components, digital PBXs, and voice response systems.

ALCATEL RADIO SPACE & DEFENSE

6 Leng Kee Road, 05-04/05 Thye Hong Center
Singapore, 0315 SINGAPORE
475-1266; fax: 475-4301

■ Space and defense.

ALLGONAB

111 North Bridge Road, #11-04/06 Peninsula Plaza
Singapore, 0617 SINGAPORE
336-6577; fax: 339-5291

■ Per Wejke, President; Mika Hylund, International Sales Manager

■ Manufactures antennas for cellular (mobile, handheld and base station), VHF/UHF and 18 GHz, and combiner and automated combiner equipment for cellular and trunking frequencies. Provides engineering, furnishing and installation services.

ALLIED COMMUNICATIONS

19 C.S.C. Complex, DDA Flats, Sukhdev Vihar
New Delhi, 110025 INDIA
11-683-9615; 636-208; fax: 11-683-4630; 683-5403

■ R. Choudhry, Chief of Research and Development

■ Manufactures channel modulators, combiners, receivers, headend amplifiers, and line extenders. Distributes coaxial cables, LNBs and line equipment.

ALSYS K.K.E. COMPANY LTD.

TechnoWave 100, 16F, 1-25 Shin-Urashima-cho
Yokohama, 221 JAPAN
(04)5451-2412; fax: (04)5451-2419

■ Jun Shimura, General Manager

■ Manufactures and distributes control software and satellite tracking software. Provides engineering services, software development, technical support, and training services.

AMERICAN POWER CONVERSION

#03-10 Holland Hill Park, 7A Holland Hill
Singapore, 1027 SINGAPORE
474-0789

■ Roger Dowdell, President and Chief Executive Officer; Dave Vieau, Vice President of Marketing; Richard L. Chuang, North Asia Regional Manager; Aaron Davis, Marketing Communications Manager

■ Manufactures power protection equipment for data, voice, computing, and communications systems. Flagship products include Smart UPS, backup UPS and surge protectors.

ANDERSEN CONSULTING

360 Collins Street, Level 19
Melbourne, VIC 3000 AUSTRALIA
(3)286-7908; fax: (3)286-7100

■ George T. Shaheen, President; Alan Burgess, International Marketing Manager; M. John Craver, Asia-Pacific Marketing Manager

■ Provides consulting.

ANRIGA LIMITED

Unit Number 23-6, 23/F Honor Industrial Centre,
Number 6 Sun Yip Street
Chai Wan, HONG KONG
558-3038; fax: 896-0032

■ Distributes TVRO, SMATV and CATV equipment.

ANRITSU CORPORATION

5-10-27, Minamiazabu, Minato-ku
Tokyo, 106 JAPAN
(03)3446-1111

Year established: 1031; 3,000 employees

■ Kiyomi Shimizu, General Manager of Radio Products Division

■ Manufactures earth station equipment and ship-board earth stations.

ANTECH DEVELOPMENT LTD.

M P Industrial Centre, 1901-1906 Block B, 18 Ka
Yip Street

Chai Wan, HONG KONG

515-0191; fax: 898-2199

■ V. R. Derek Cheng, President; Gary Chan, Marketing Manager

■ Manufactures DBS antennas. Distributes antennas, coaxial cables, feedhorns, LNBs, and receivers.

ANTENNA SPECIALISTS

100 Beach Road, #12-05 Shaw Towers
Singapore, 0718 SINGAPORE
291-9733; fax: 291-9403

■ Erik Van Der Kaay, President; Jerry Stupka, International Sales Manager; Kim Goryance, International Marketing Manager for Asia-Pacific; William Fong, Managing Director

■ Manufactures mobile, base station and portable antennas; cellular site management equipment including combiners, duplexers and filters; and a line of low power boosters and high power repeaters. Provides specialized antennas for monitoring, amateur radio, marine, and personal communications.

ANU ENTERPRISES

Nizamuddin East, P.O. Box 3215
New Delhi, 110013 INDIA
462-2963

Year established: 1987; 16 employees; area served: international; ownership: private

■ C. Lal, Partner; M. Lal, Marketing Manager

■Manufactures LNAs, antenna accessories and equipment, antenna systems, antennas (C- and S-band and microwave), broadband CATV distribution systems, CATV equipment, channel selectors, combiners, UHF and VHF converters, decoders, demodulators, diplexers, discriminators, scalar feed systems, filter banks, filters (band pass, coaxial, low pass, microwave, notch, and SAW), modulators, mounts (differential, fixed antenna, motorized, polar, steerable, and X/Y), T-1 and wideband multiplexers, PCM systems, polarizers, positioners, transmission and receiving equipment, and transmission systems. Provides cable systems installation and maintenance, legal services, and recruitment and personnel services.

ARIANESPACE—ASIA PACIFIC OFFICE

Hibiya Central Building, 10F, 1-2-9, Nishi-Shimbashi
Tokyo, 105 JAPAN
(03)3592-2766; fax: (03)3592-2768
Year established: 1986; 6 employees; area served: Asia Pacific
■Jean-Louis Claudon, Asia-Pacific Representative; Dieter Brand, Deputy Representative; Kiyoshi Takamatsu, Assistant Manager; Yoshiko Nakagawa, Head of Administration
■Provides satellite launch services using Ariane 4 and Ariane 5 vehicles.

ARIES ELECTRONICS AGENCIES PVT LTD.

201, Raghava Cottage, Dwarakapuri Colony, Panjagutta
Hyderabad, 500482 INDIA
842-221-317; 228-601; fax: 842-212891
■B. V. K. Raju, Marketing Director
■Manufactures amplifiers and antennas. Distributes CATV systems. Provides consulting, software and turnkey systems.

ASCOM TIMEPLEX FAR EAST

30/F Windsor House, 311 Gloucester Road
Causway Bay, Hong Kong HONG KONG
830-9889; fax: 895-4152
■Colin Chan, President; Sam Lam, International Sales Manager; Marco Capriz, International Marketing Manager
■Manufactures TDM systems for T1/E1 services, packet switching systems and LAN interconnection equipment to international standards.

ASHIN CORPORATION

805 Kukje Building, 39-1 1-Ka, Pil-dong, Chung-ku
Seoul, KOREA
(02)275-2771; fax: (02)274-0302
■K. T. Kim, President
■Provides TVRO products and systems.

ASIA PACIFIC SATELLITE CONSULTANTS INC.

Sucaco Building, 5th Floor, Jalan Kebon Sirih 71
Jakarta, 10340 INDONESIA
21-310-650/2601; fax: 21-310-6502
Year established: 1993; 4 employees; area served: Pacific Rim; ownership: private
■Regina S. Wijaya, President; Paul M. Kuhns, Senior Consultant; Kevin C. Kuhns, Vice President
■Provides Asia-Pacific satellite business development; services including entry strategy and key business contacts; conducts studies and assesses new business opportunities for companies in satellite-related fields wishing to conduct business in the Asia-Pacific market.

ASTRATECH COMMUNICATIONS

G.P.O. Box 2086
Canberra, ACT 2601 AUSTRALIA
(6)241-6019
Year established: 1986; area served: Australia and Asia; ownership: private
■Matthew L. James, Principal
■Provides consulting services in space technology marketing, education and conferences; expositions and seminars. Supplies publications.

AT&T ASIA PACIFIC INC.

24/F Three Exchange Square, 8 Connaught Place Central
Hong Kong, HONG KONG
846-2888; fax: 810-0564
■James G. Cosgrove, Vice President; Richard M. Brandt, Regional Marketing Vice President
■Provides communications services and products, as well as network equipment and computer systems to businesses, consumers, telecom service providers, and government agencies.

AT&T PARADYNE FAR EAST

Room 901 Wing on Center, 111 Connaught Road Central
Hong Kong, HONG KONG
543-0083; fax: 541-3767
■John Mitcham, President; Art Davie, Executive Vice President International; James Ang, Regional Director
■Provides data communications equipment and services including modems, multiplexers, network management systems, and channels extenders for IBM mainframes.

AUSPACE LTD.

P.O. Box 17, 50 Hoskins Street
Mitchell, ACT 2911 AUSTRALIA
(6)242-2611; fax: (6)241-6664
30 employees
■Manufactures global positioning systems, sensor systems, GPS navigational products, receivers and boardsets; aerospace research and development.

AUSTERNETICS PTY. LTD.

P.O. Box 503
Manly, NSW 2095 AUSTRALIA
(2)977-1194; fax: (2)977-4582
■P. C. F. Morgan, Managing Director
■Provides satellite consulting services.

AUSTRALIAN CENTRE FOR REMOTE SENSING

Dunlop Court, Fern Hill Park
Bruce, ACT 2617 AUSTRALIA
(6)252-4411; fax: (6)251-6326
Year established: 1970; 40 employees
■Carl McMaster, Manager; Tim Shirley, Business Manager; Dennis Puniard, Director of Marketing; Paul Wise, Director of Operations; Bob Jones, Administration Officer; Robert Denize, Chief Engineer
■Provides acquisition, processing and distribution of remotely sensed data.

AV-COMMPTY LTD.

70 Wanganella Street
Balgowlah, NSW 2093 AUSTRALIA
(2)949-7417; fax: (2)949-7095
■Gary Cratt, Technical Director
■Provides feedhorns, decoders and LNBs.

AWA COMMUNICATIONS

2-6 Orion Road, Lane Cove NSW
Sydney, NSW 2066 AUSTRALIA
(2)413-6333; fax: (2)413-6300
■Neville Parr, President; Werner Bahr, International Sales Manager; Max Berresford, International Marketing Manager; Andrew Koo, Asia Sales Manager
■Designs, manufactures and supplies telecom transmission equipment. Products include digital microwave radios operating in the 1-3 GHz frequency bands, with capacities from 2 Mbps up to 2x8 Mbps. Multiplex equipment consisting of both primary 30 channel multiplex and 2-8 second order multiplex. Complete turnkey solutions including system planning and design.

AWA DEFENSE LTD.

15 Talavera Road
North Ryde, NSW 2111 AUSTRALIA
(2)887-7711
■John Myers
■Designs communications systems; installs and supports ground stations. Provides uplink monitor and control systems for multicarrier ground stations using Intelsat. Provides carrier monitoring of Ku-band satellite networks.

AZIMUTH (FAR EAST) LTD.

5 Wangjing Zhonghnan Nanlu, Chaoyang District
Beijing, 100015 CHINA
(1)436-1898; fax: (1)436-1891
Year established: 1990; area served: China and Mongolia; ownership: private
■Colin Withers, Managing Director; Grace Zhu, Office Manager; Lisa Zeng, Sales and Marketing Manager; Anthony Black, Technical Director
■Supplies and installs TVRO, SMATV and Pay TV.

BALI INTERNATIONAL AGENCIES

Mathuradas Estate, Kalina, Box 7059
Bombay, 400029 INDIA
22-612-3046; fax: 22-680-2322
Year established: 1956; 20 employees; area served: India

- Supplies scientific space equipment.

BEIJING ASIA SATELLITE COMMUNICATIONS TECHNOLOGY COMPANY LTD.

P.O. Box 2727
Beijing, 100080 CHINA
(1)256-2573; fax: (1)256-1264
Year established: 1987; area served: international; ownership: public
■Qide Li, Researcher; Qibing Li, Researcher; Wei Hong, Accountant; Wenzhong Liu, Senior Engineer; Dongong Ibang, Senior Engineer; Guoehui Ji, Senior Engineer
■Manufactures, sells and services satellite antennas and antenna products.

BEST SYSTEMS CORPORATION

5F No. 5 Lane, 538 Chung Cheng Road
Taipei, TAIWAN
(2)218 6286; fax: (2)218 1508
■Solomon Wang, President; John Candler, European Sales Manager
■Provides TVRO products and systems.

BHARAT ELECTRONICS LTD.

Trade Centre 116/2 Race Course Road
Bangalore, 560001 INDIA
812-269-897; 812-267-322; fax: 812-265-657; 812-268-410
Year established: 1954; 20,000 employees; 1993 projected revenues: \$300,000,000; area served: international
■V. K. Koshy, General Manager of International Marketing; P. D. Modak, Chairman and Managing Director; J. I. Devadatta, Financial Director; G. S. Chandraskharan, Director; J. J. Bazi, Director of Research and Development
■Manufactures S-, C- and extended C-band TVROs; uplinks and downlinks; antennas; HPAs; LNAs; modems; hub stations and flyaway earth terminals; satellite networking system for voice and data-based digital SCPC, consisting of mobile/transportable terminals of small to medium capacity; mobile satellite communications equipment; LNBs; uplinking terminals; antennas; and klystrons. Provides systems engineering, design and research and development services.

BRITISH AEROSPACE AUSTRALIA LTD.

P.O. Box 180
Salisbury, SA 5108 AUSTRALIA
(8)343-8211; fax: (8)349-6629
800 employees
■A. Hodgson, Chief Executive; T. Harris, Director
■Provides satellite ground stations and remote sensing.

BUSSMAN DIVISION COOPER INDUSTRIES

Prince Edward Road, #04-07 Finger Pier Building
Singapore, 0207 SINGAPORE
227-5346; fax: 227-5384
■Ralph Jackson, President; Robert Barnes, International Sales Manager; Stephen Whitney, International Marketing Manager

- Provides circuit and power distribution protection devices, fuses, fuse holders, power distribution blocks, disconnect and gas tube surge arresters.

C.E.B.I.

P.O. Box 7320 DAPO, Pasay City
Metro Manila, 1300 PHILIPPINES
(2)532-7283; fax: (2)866-528
■Ernie L. Claudio, President; Menardo G. Jimenez, Vice President
■Provides technical consulting services.

CABLE & SATELLITE BROADCASTING ASSOCIATION OF ASIA (CASBAA)

c/o Denton Hall Burgin & Warrens, 1001 Hutchison House, Harcourt Road
Hong Kong, HONG KONG
823-0130; fax: 861-2671
Year established: 1992
■Linda Kao de Lailon, Executive Director
■Non-profit association of organizations in the cable and satellite broadcasting industry in Asia.

CABLE & SATELLITE TV GUIDE

23 Jenai Road, Sec. 3, #5F
Taipei, TAIWAN
(2)778-5818; fax: (2)778-5815
■Vicky Tu, Publisher; Alan Shih, President
■Publishes Chinese language trade magazines in Taiwan.

CAD CAM INDUSTRIES

G.P.O. Box 5264
Central District, HONG KONG
524-2483; fax: 524-4730
Year established: 1989
■Bernd Ebert, President; Patrick Braun, International Sales Manager; Bettina Braun, International Marketing Manager
■Develops and manufactures satellite equipment. Manufactures consumer TVRO receivers and Grundig SMATV equipment.

CHANNEL MASTER

Shop No. 3A, Jyoti Estate, 54-C, Proctor Road, Off Lamington Road
Bombay, 400007 INDIA
387-9390; 388-7275; fax: 422-852-342
■Distributes TVRO equipment.

CHINA GREAT WALL INDUSTRY CORPORATION

21 Huangsi Dajie, Xicheng Qu
Beijing, 100011 CHINA
(1)837-2942; (1)837-2707; fax: (1)837 3155
■Zeng Longyong, Director of GWIC's Library; Yu Fusheng, Vice President and Senior Engineer; Chen Shouchun, Vice President and Chief Engineer; Zhang Xinqiang, Regional Manager
■Manufactures satellites and ground systems. Operates the Long March launch vehicles and launching system.

CHINESE ACADEMY OF SPACE TECHNOLOGY

P.O. Box 2417, 31 Bai-Shi Qiao Lu
Beijing, 100081 CHINA
(1)837-9439; fax: (1)8378237
■Min Guirong, President
■Manufactures FSW recoverable spacecraft and communications, meteorology and earth exploration satellites.

CITY CHANNELS

Door No: 60-C, Robertson Road, R.S. Putnam (West)
Coimbatore, 641002 INDIA
422-852-342; fax: 422-852-342
■K. R. Kumar, Consultant
■Provides technical consulting services.

CODAN PTY. LTD.

24/818 Pittwater Road
Dee Why, NSW 2099 AUSTRALIA
(2)971-2233; fax: (2)982-1117
Year established: 1959; 250 employees; 1993 projected revenues: \$20,000,000; area served: international; ownership: private
■Gary Smith, Marketing Manager; Mike Heard, Managing Director
■Provides C-band transceivers for simple and multicarrier applications and transceiver subsystems.

COMPUTECH MICROSYSTEMS COMPANY LTD.

5th Floor MK Building, 719 Chula Soi 10, Bantadtong Road, Pathumwan
Bangkok, 10330 THAILAND
(2)215-5122; fax: (2)216-6059
■Wachara Mongkonsuthornchote, Managing Director
■Provides TVRO equipment and systems.

COMSTAR COMPANY LTD.

808/6 Sukhumvit 55 (Thong Loh)
Bangkok, 10110 THAILAND
(2)391-1729; fax: (2)391-1729
■Pornpod Thongmeeakom, Managing Director; Benjaporn Jirapivong, General Manager
■Distributes TVRO equipment.

COMSTREAM CORPORATION

CD19 Cliffview Mansion, 21 Conduit Road
Hong Kong, HONG KONG
559-6907; fax: 858-6234
■Meldon K. Gafner, President; Michael Blair, Regional Director
■Supplies digital satellite communications equipment and networks for data, voice, audio, and video. Offers data broadcast networks, digital video demodulators and related accessories, and networks based upon the applications of these products. Provides engineering, furnishing and installation services.

CRITEC PTY LTD

Technopark, Downings Point
Hobart, 7010 AUSTRALIA
(2)730-066; fax: (2)731-871

■J. R. Gumley, President; W. D. Temple, International Sales Manager; A. J. Surtees, International Marketing Manager

■Provides lightning and transient protection, including surge protection filters from 10 amps to 1500 amps offering surge ratings up to 100,000 amps, together with UPS and DC to AC inverters available in power conditioning. LAN protectors, PBX protectors, coaxial protectors, and transient barriers. Provides engineering, furnishing and installation services.

CSIRO DIVISION OF RADIOPHYSICS

P.O. Box 76

Epping, NSW 2121 AUSTRALIA

(2)372-4222; fax: (2)372-4400

Year established: 1939; 170 employees; area served: international; ownership: government

■Dennis Cooper, Chief of Division; Dennis Rodfern, Marketing Manager; Trevor Bird, Research Manager

■Antenna feeds, feed systems and reflectors; earth station antennas, on-board satellite antennas, microwave components, antenna and microwave measurement services, customized designs, and consultancy services.

DAEYOUNG ELECTRONICS INDUSTRIES COMPANY LTD.

185-4 Seobinggo-dong

Yongsan-ku, Seoul, KOREA

(02)790-6873; fax: (02)790-6878

Year established: 1968; 1,200 employees; 1993 projected revenues: \$1,200,000,000; area served: international; ownership: public

■D. Y. Jeong, President and Chief Executive Officer; J. M. Jeon, Director; Y. S. Kwon, Director; P. C. Kim, Manager; H. J. Kim, Manager; D. S. Chae, Manager

■Specializes in government telecommunications networks and military special communications systems. Supplies satellite broadcast receiving systems.

DATA COMMUNICATIONS COMPANY

Building 65-228 3-Ga, Hangang-Ro, Yongsan-Gu Box 58

Seoul, KOREA

(02)220-6750; fax: (02)796-8500

■Jung-Hoon Lee

■Provides local data and international communications services.

DATA SYSTEMS SALES (DSS)

733 Bishop Street #170-49

Honolulu, HI 96813 USA

(800)292-4377

■Resells information networks. Supplies integrated data processing systems and communications infrastructure. Network planning and project management.

DATA CRAFT

3/F City Plaza III, Taikooshing

Hong Kong, HONG KONG

807-2313; fax: 807-2574

■Des Althorp, President; Bill Brindle, International Sales Manager; Bob Baker, International Marketing Manager; Alex Wong, North Asia General Manager; Ron Cattell, South Asia General Manager; Aston Chiu, Director

■Provides data communications products, network design, consulting, project management, training services, and installation and maintenance.

DATA CRAFT PTE. LTD. — SINGAPORE

1020 Hougang Avenue 1, 04-3506 Tai Seng Industrial Estate

Singapore, SINGAPORE

280-5155; fax: 382-2568

Year established: 1983; 26 employees; 1993 projected revenues: \$9,000,000; area served: Singapore and Indonesia; parent: Datacraft (Asia) Pte. Ltd.; ownership: private

■Koh See Heong, Managing Director; Jismyl Teo, Finance and Administration Manager; Dereck Lee, System Consultant; C. Tang, Customer Service Manager

■Provides network and data communications systems. Distributes Cisco, Synoptics, Cableonce, Micom, Symplex, N.E.T., and Blackbox products.

DATA CRAFT (THAILAND) LTD.

21 Floor, CTI Tower, 191/44 Rachadaphisek Road Bangkok, 10110 THAILAND

(2)611-2914; fax: (2)611-295

20 employees; area served: Thailand; parent: Datacraft (Asia) Ltd.; ownership: private

■Lerchai Boonkoonsak, General Manager; Wipaporn Sakul-Eam, Chief Accountant; Anugorn Tantarawanich, Marketing Manager; Anusorn Tanaklikamthorn, Sales Manager; Anchana Tonprasert, Coordinator

■Provides data communications solutions in the Asia-Pacific region, as well as develops, manufactures and supplies Datacraft products.

DECIBEL PRODUCTS

76 Tagore Lane 3/F

Singapore, 2678 SINGAPORE

459-8288; fax: 456-3855

■Peter Mailandt, President; Peter Deriellias, International Sales Manager; Bob Corwin, International Marketing Manager

■Manufactures 30 MHz-2000 MHz dynamic RF antenna systems.

DELTA ELECTRONICS INC.

Level 28 Menara Haw Par, Jalan Sultan Tsmail

Kuala Lumpur, 50250 MALAYSIA

(03)233-6107; fax: (03)233-6222

■William E. Gibson, President; Don MacLeod, Vice President Asia-Pacific; Michael M. Michigami, Chairman and Chief Executive Officer

■Designs, manufactures and markets advanced, high-performance digital microwave radios and other short-haul communications products for use in cellular telephone systems, private networks and other telecommunications applications worldwide. The products have the capacity to transmit and receive multiple digital lines up to 45 Mbps carrying voice and data signals.

DIXIT ASSOCIATES

27-24 K.M. Naskar Road

Calcutta, INDIA

33-724-895; 266-936; fax: 33-766-964

■Dixit Vinay, Partner; Dixit Sanjay, Partner

■Provides LNBs, antennas, receivers, and feedhorns.

DURA-LINE CORPORATION

Kokunited States Shin Akasaka Building, Higashikan 8/F, 14-27 Akasaka 2-chome

Minato-ku, Tokyo 107 JAPAN

(03)3588-9810; fax: (03)3588-9935

■John Shoffner, President; Joel Spencer, International Marketing Manager

■Manufactures polyethylene innerduct for fiber optic, power and CATV cable installations. Products include underground, direct buried, aerial, prelubricated, multi-celled, dielectric detectable, fire-retardant and cable-in-conduit innerduct, and accessories.

DX TRADING COMPANY LTD.

7th Floor DX Building, East Annex, Hamazaki-Dori Hyogo-Ku

Kobe, 652 JAPAN

(78)652-0613; fax: (78)652-0683

■Provides TVRO products and systems.

DYNASCAN INSPECTION SYSTEMS

18/10A Cambridge Road

Bangalore, 560008 INDIA

576-129

20 employees; area served: India and Asia

■Arun Kumar, Managing Partner; Shri Arun Kumar, Partner

■Provides remote sensing imagery equipment.

E-TECH INC.

22, R&D Road 2, SIP

Hsinchu, TAIWAN

(35)774991; fax: (35)777751

Year established: 1987; 150 employees; 1993 projected revenues: \$15,000,000; ownership: private

■Carter Tseng, President; Wayne Shen, Planning Chief; Young Lim Su, Vice President of Engineering

■Manufactures data communications products.

ECHBEE CORPORATION

38 Cawasji Patel Street

Bombay, 400001 INDIA

204-3489; 204-8341

Year established: 1968; 12 employees; 1993 projected revenues: \$2,000,000; area served: India

■Hasmuk B. Shah, Owner; Hansa H. Shah, Finance Director; K. Estapones, Sales Executive

■Manufactures accelerometers, actuators, adaptors, amplifiers (high power, IF, klystron, low noise, low power, RF, servo, SSPA, and TWT), analyzers, attenuators, cable, coaxial cable, fiber optic cable, integrated circuits, decoders, display systems, equalizers, filters (auxiliary skirt, coaxial and microwave), frequency counters, gyroscopes, video source identifiers, lubricants, microwave equipment, SCPS modems, monitoring equipment, motors, statistical multiplexers, time division multiplexers, optical equipment, optronic equipment, positioners, relays, RF equipment, switches (coaxial, PIN and protection), test equipment, tools, tracking and control systems, upconverters, video processors, waveguides, and wideband broadcasting equipment. Techno-legal consultancy for Indian customs and import regulations. Provides assessment and evaluation, technical consulting, engineering services, financial services, legal services, licensing procurement and services, marketing services, and technical support.

ECHBEE TECHNO LEGAL AID CENTRE

Kamer Building, 38 Cawasji Patel Street
Bombay, 400006 INDIA
204-3489
Year established: 1985; 14 employees
■Hasmukh Shah, Chief Consultant
■Provides consulting and legal services.

ECHOSPHERE ASIA

16A Science Park Drive, The Pascal
Singapore, 0511 SINGAPORE
■Scott Zimmer, President
■Provides TVRO products and systems.

ECHOSPHERE CORPORATION — ASIAN DIVISION

Unit B Block A, Wo Kee Hong Building, 585-609
Castle Peak Road
Kwai Chung, N.T., HONG KONG
494-8823; fax: 494-8855
■Zhang Hai Ming, Director of Operations
■Provides SMATV products.

ED ENGINEERING COMPANY LTD.

1024-4 Bangbae-Dong, Seocho-ku
Seoul, KOREA
(02)582-1981; fax: (02)582-1985
■Young Jin Park, President
■Provides digital LCR meters, digital IC testers, FM/AM signal generators, level meters, frequency counters, digital panel meters, AF generators, testing devices, DC power supplies, equipment for sweep function educational purposes generators, EP-ROM programmers, microwave trainers, X-Y plotters, color TV trainers, and microprocessors.

E-HWA ELECTRICAL INDUSTRIES COMPANY LTD.

282-4 Pangyi-Dong, Songpa-ku
Seoul, KOREA
(02)414-8111; fax: (02)414-1473
■Soo Yoon Bae, President

■Provides UPS systems, power supplies for ESS, silicon rectifiers, mold transformers, automatic voltage regulator, frequency converters, VVVF inverters, battery chargers, SF6 gas circuit breakers, and switchgear.

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE (ETRI)

P.O. Box 8, Daeduk Science Town
Daejeon, KOREA
(42)860-6849; fax: (42)860-6504
■Myeong-Cheol Park, Head of Management Section
■Provides satellite consultancy.

EXACTEL COMMUNICATIONS PTE. LTD.

315 Outram Road, Suite 15-05, Tan Boon Liat Building
Singapore, 0316 SINGAPORE
227-7335; fax: 277-7335
Year established: 1991; area served: South and Southeast Asia; ownership: private
■Raymond Choy, Managing Director
■Provides satellite receivers, antennas, LNB/LNBF, feedhorns, actuators, dual RG6 cable, line amplifiers, and splitters.

FIL PRODUCTS INC.

810 Tres De Abril, Lababgon
Cebu City, PHILIPPINES
(2)632-9037; fax: (2)631-3258
■Nonito A. Limchua, President; Diana D. Limchua, Vice President of Finance; Venancio Pamimdim, Technical Vice President
■Manufactures transmitters (television and FM), amplifiers and translators. Provides splitters, amplifiers and taps.

FLTEC ELECTRONICS

304 Alankar Ind. Estate, Off Aarey Road, Goregaon (East)
Bombay 63, INDIA
888-4467
■Provides SMATV and CATV systems.

FUJI HEAVY INDUSTRIES LTD.

7-2 Nishi-Shinjuku 1-chome, Shinjuku-ku, Subaru Building
Tokyo, 160 JAPAN
(03)3347-2588; fax: (03)3347-2588
14,874 employees
■Yasuyuki Kogure, Managing Director and General Manager; Saburo Ogino, Director and Deputy General Manager
■Provides research and development for NASDA's unmanned space shuttle; H-II rocket; space station module; and NAL space plane.

FUJITSU LTD.

6-1 Marunouchi, 1-chome
Chiyoda-ku, Tokyo 100 JAPAN
(03)216-3211
106,000 employees
■Takuma Yamamoto, President

■Manufactures communications and space electronic systems.

FURUKAWA ELECTRIC COMPANY LTD.

6-1 Marunouchi 2-chome, Chiyoda-ku
Tokyo, 100 JAPAN
(03)3286-3419; fax: (03)3286-3708
■Kengo Tomomatsu, President; Masaaki Suzuki, International Sales and Marketing Manager
■Develops and manufactures optical fibers and cables, optical components and devices and metal cables for telecommunications. Optical systems include automatic fiber monitoring systems, EDFA and advanced fiber splicers. Provides engineering, furnishing and installation services.

FURUNO ELECTRIC COMPANY LTD.

9-52 Ashihara-cho
Nishinomiya, 662 JAPAN
(0798)65-2111; fax: (0798)65-4200
Year established: 1951; 1,900 employees; 1993 projected revenues: 51 billion Y; area served: international
■Kiyokata Furuno, Chairman; Toshihiko Yamakawa, Chief Financial Officer; Hiroaki Komatsu, Marketing and Sales Representative
■Manufactures ship earth stations.

FUTURE HI-TECH COMPANY LTD.

68 Sukhumvit 31
Bangkok, 10110 THAILAND
(2)258-2889; fax: (2)258-8097
■Rachanee Yingchairak, Managing Director
■Provides VSAT systems and products.

GANA CORPORATION

320 Kongdan-Dong
Kumi Kyung Sang Buk-Do, 730030 KOREA
(546)25307; fax: (546)461-8588
■Jang Bum Lee, President; Won Sik Choi, Managing Director
■Provides TVRO products and systems.

GARDINER COMMUNICATIONS CORPORATION

Room 4507A, Metroplaza Tower 2, 223 Hing Fong Road
Kwai Chung, N.T., HONG KONG
420-7081; fax: 489-1492
■Horace Chui, Regional Manager
■Manufactures and distributes downconverters, feedhorns, LNBs, and receivers.

GIOREINSURANCE

2 Martin Place
Sydney, NSW 2000 AUSTRALIA
(2)228-1327; fax: (2)235-3909
Year established: 1926; 2,500 employees; 1993 projected revenues: \$1,000,000,000; area served: international
■Kirby Ikin, Space Business Development
■Provides insurance services including orbital debris hazard analysis through a joint venture company, Spaceguard Pty. Ltd.

GOLDSTAR COMPANY LTD.

Lucky-Goldstar Twin Towers, 20 Yoido-Dong,
Youngdungpo-ku
Seoul, KOREA
(02)787-1114; fax: (02)787-3400
■Hun Jo Lee, President
■Provides electronic equipment.

GOLDSTAR INFORMATION AND COMMUNICATIONS LTD.

Lucky-Goldstars R&D Complex, 533, Hogue-Dong,
Anyang-Shi
Kungki-Do, KOREA
(343)50-7246; fax: (343)50-7008
■Provides transponder components and VSAT earth station.

GTE HAWAIIAN TEL

P.O. Box 2200
Honolulu, HI 96841 USA
(808)643-1000
■Provides telecommunications system construction, integration, operation, and maintenance in the Pacific.

HAN YOUNG ELECTRICAL COMPANY LTD.

317-10, 2Ka, Sungsoo-Dong, Sungdong-ku
Seoul, KOREA
(02)463-6141; fax: (02)465-2311
■Young Soo Han, President
■Provides uninterruptible power supplies, rectifiers, battery charges, inverters, converters, automatic voltage regulators, and switch boards.

HANJIN ELECTRONICS COMPANY

Changeun Building, 682-23, Yolsam-Dong,
Kangnam-ku
Seoul, KOREA
(02)552-7511; fax: (02)552-8711
■Chung Yoon Han, President
■Provides CATV systems, distribution frame systems, DLCS, cable connector line concentrators, cellular and portable phones, pagers, transceivers, and wireless phone systems. Also supplies subscriber radio systems and monitoring systems, transmitters, FM exciters, TVR, FMR, amplifiers and megaphones, horn speakers, radio communications equipment, and remote control systems.

HAWKER DE HAVILLAND LTD.

P.O. Box 30, Milperra Road
Bankstown, NSW 2200 AUSTRALIA
(2)772-8111; fax: (2)771-2632
2000 employees
■J. B. Hattersley, Managing Director
■Participates in the design and manufacture of Litesat bus in association with University of Surrey, United Kingdom.

HIGH COMMUNICATIONS

No. 217, Sharadi Colony, Basaveswaranagar
Bangalore, 560 079 INDIA
335-1938; fax: 221-6165
■K. M. Ansar, Chief Executive
■Provides satellite antennas, amplifiers, cables, and receivers.

HIGH GAIN ANTENNA COMPANY

Ansan City, Kyunggi-Do, 426-090
Ansan City, 426-090 KOREA
(02)856-6650; fax: (02)491-3679
■Don Shin Lee, President
■Manufactures satellite earth station antennas; microwave communications antennas; HF/VHF/UHF communications antennas; rigid line, waveguide, connector components, and diplexer DBS TV receiving antennas.

HIGH TECHNOLOGY DEVELOPMENT CORPORATION

300 Kahelu Avenue, Suite 35
Mililani, HI 96789 USA
(808)625-5293
Year established: 1983
■Facilitates development and growth of commercial high technology industry in Hawaii. Services include business attraction and retention programs; on-line database; market research; policy and planning advice.

HIND HIGH VACUUM COMPANY LTD.

Pennya Industrial Area Phase 1 Site 17
Peenya, Bangalore 560058 INDIA
80-394615; fax: 80-394874
Year established: 1965; 3,500 employees; 1993 projected revenues: \$3,500,000; area served: India; parent: Hind High Vacuum Company Pvt. Ltd.; ownership: private
■S. V. Narasiah, Chairman; M. R. Rajagopalan, Finance Controller; V. Nagabhushanam, Marketing Director; Vedula N. Murthy, General Manager of Marketing; V. K. V. Raju, Technical Director; S. Pramila, Purchase Manager
■Manufactures vacuum and high vacuum equipment, including coating units, simulation chambers with low and high temperatures for vacuum, specially designed equipment for space applications, sputtering plants, and test equipment for leak detection.

HINDUSTAN AERONAUTICS LTD.

15/1 Cubbon Road, P.B. 5150
Bangalore, 560001 INDIA
812-266901/6; fax: 812-577533
39,000 employees
■Manufactures structural assemblies for launch vehicles.

HITACHI LTD.

6, Kanda-Surugadai 4 chome, Chiyoda-ku
Tokyo, 101 JAPAN
(03)3258-1111; fax: (03)3292-8955
234,292 employees
■Tsutomu Kanai, President; Reijiro Fukutomi, Senior Executive Managing Director
■Manufactures satellite laser tracking systems, observation satellite ground station and satellite-borne measurement equipment.

HITACHIOSEN CORPORATION

1-1 Hitotsubashi, Chiyoda-Ku
Tokyo, JAPAN
(03)3217-8418; fax: (03)3217-8545

■Yoshihiro Fujii, President; Hirozumi Wada, Executive Vice President; Masaru Hirako, Executive Vice President; Hiroshi Kimura, Executive Vice President; Kenji Yamaguchi, Senior Managing Director; Toshihiko Tanigoshi, Executive Vice President; Shogo Furuta, Executive Vice President; Iso Minami, Executive Vice President; Tamotsu Sakai, General Manager of Financial Department; Tomoo Nakata, Public Relations
■Manufactures test equipment.

HITRON PTY. LTD.

P.O. Box 9209
Hohola, N.C.D., 9209 PAPUA NEW GUINEA
25-2311; fax: 25-0349
■Lindsay Jorgensen, Managing Director; Anne Ames, Sales and Marketing
■Distributes TVRO and cable television systems. Provides installation of satellite television and cable television systems; technical consultancy.

HUGHES NETWORK SYSTEMS

205 Tun Hau North Road
Taipei, 10592 TAIWAN
(2)514-7122; fax: (2)514-7126
■Jack Shaw, Chairman; Pradman Kaul, President; Michael Sun, Asia Regional Director; Paul Gaske, Vice President of Satellite Networks; Emilio Cecchi, Vice President of Packet Switching; Jake MacLead, Vice President of Cellular
■Provides very small aperture terminal (VSAT) satellite networks. Products can be configured in both mesh and star configurations and used for corporate data, voice and video communications, as well as rural telephony and emergency communications. Also provides X.25 packet switching and frame relay networks. Wireless telephony cellular network for both fixed and mobile applications. Also manufactures dual-mode (analog/digital) mobile telephones.

HUMPHERY INTERNATIONAL COMPANY LTD.

2F 521, Section 5, Chung Shan N Road
Taipei, 11120 TAIWAN
(2)882-1257-9; fax: (2)882-2857
■Wang Nai Rung, Managing Director
■Manufactures Ku- and S-band and VSAT antennas; feed horns; polarizers; and passive splitters.

HUTCHISON TELECOMMUNICATIONS LTD.

27/F, 23 Harbour Road, Great Eagle Center,
Wanchai
Hong Kong, HONG KONG
828-3222
■Richard J. Siemens, Group Managing Director
■Provides personal communications networks; telepoint (CT-2) cellular telephones; paging; mobile data; trunked mobile radios; international value-added services; satellite systems and services; information services; and broadcast radio. Provides engineering, furnishing and installation services.

HWANG PIIN INDUSTRIAL COMPANY LTD.

254 Chung Chen Road
Lu-Jou Hsiang, Taipei TAIWAN
(2)281-6636; fax: (2)282-8180
Year established: 1972; 50 employees; 1993 projected revenues: \$1,000,000
■Tony Lee, President; David Sun, Export Manager; Vivian W. Lee, Chief Financial Officer; Iris Su, Marketing Contact; Jimmy Lee, Sales and Technical Contact; San B. Chan, Purchasing Contact
■Provides TVRO products and systems, antenna accessories and equipment, C- and Ku-band antennas, and feed horns.

HYUNKWANG ELECTRONICS AND TELECOMMUNICATIONS INC.

188-6 Suya 3 Dong, Dobong-ku
Seoul, KOREA
(02)908-0861; fax: (02)900-1430
■Sungku Lee, President; Haewoon Lee, Executive Vice President; Dongshin Chang, Marketing Director
■Manufactures RF and MF subsystems and LNBs.

I.S.N. CORPORATION

Flat 2E Montieth Court, 69 Montieth Road, Egmore
Madras, 600 008 INDIA
826-8118
■Harish Bhaskar, Director of Marketing; Hemanth Bhaskar, Technical Director
■Manufactures C-band antennas (mobile and fixed). Cable television operator.

INDIAN SPACE RESEARCH ORGANIZATION

Antariksh Bhavan, New BEL Road
Bangalore, 560 094 INDIA
812-334474; fax: 812-334229
16,700 employees
■U. R. Rao, Chairman; M. G. Chandrashekar, Scientific Secretary
■Designs and builds hardware involved in space technology, including rockets and satellites for scientific research, communications networks, meteorology, and remote sensing of earth resources.

INDUSTRONICS SDN BHD

7 Jalan Manis 4, Taman Segar
Kuala Lumpur, 56100 MALAYSIA
(03)756-0255; fax: (03)756-8888
■J. C. Lim, Managing Director; Edwin Gan, General Manager
■Distributes TVRO, VSAT and SCPC equipment.

INFA TELECOM ASIA LTD.

38/F Manulife Tower, 169 Electric Road North Point
Hong Kong, HONG KONG
806-6688; fax: 510-7243
■Alfred Tsang, President; Benny Wong, Assistant General Manager
■Provides engineering, furnishing and installation services.

INFOCOMM INTERNATIONAL CORPORATION

102 Tung-Hwa N. Road, 13th Floor
Taibet, TAIWAN
(2)719-2668; fax: (2)719-2669
Year established: 1988; 40 employees; 1993 projected revenues: \$2,000,000; ownership: private
■Stephen Hsu, Chief Executive Officer; Peter Fei, Vice President; Everet Chang, Manager
■Provides turnkey business management systems for the telecommunications and cable television industries. Distributes VSAT systems.

INFOTECH INTERNATIONAL

11/F #102 Tun-Hwa North Road
Taipei, TAIWAN
(2)719-2668; fax: (2)719-2667
■Stephen C. Hsu, President; Roger Wu, International Sales Manager; Walt Hwang, International Marketing Manager
■Integrates computers and telecommunications; software for billing management systems in cellular; central office and paging; paging systems in Chinese characters and/or other 2-bit code characters; and cellular payphones. Distributes telecommunications and computer equipment.

INNOVATIVE TECHNOLOGIES

91A Colombo Road
Piliyandala, SRI LANKA
■P. Warnakulasuriya, Managing Partner; Nillipa Warnakulasuriya, Partner
■Manufactures receivers, TVRO dishes and receiver modulators.

ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES COMPANY LTD.

2-1, 2-chome Shin-Ohtemachi Building
Chiyodaku, Tokyo 100 JAPAN
(03)3244-5333; fax: (03)3244-5398
3600 employees
■Shozo Ojimi, Managing Director; Takuji Miyo, Division Director of Research and Engineering
■Manufactures space systems, rocket engines, rocket reaction control systems, liquid propellant engines, attitude control systems, ground test facilities, and components.

ISHIKAWAJIMA — HARIMA HEAVY INDUSTRIES COMPANY LTD.

Space Development Division, Tokyo-Chuo Building, 6-2 Marunouchi 1-chome, Chyada-ku
Tokyo, 100 JAPAN
(33)3286-2553; fax: (33)3286-2035
■Miki Sugiura, General Manager of Overseas Business; Tooru Yamanoue, Division Director; Tatsuo Ikeda, General Manager of Space Station Department
■Manufactures rocket engines, turbopumps and attitude control systems for satellites and rockets.

ISRO SATELLITE CENTER

Peenya
Bangalore, 560058 INDIA
38261

■Designs, develops, fabricates, and integrates mission operations planning for remote sensing, communications and scientific satellites.

ITC-AEROSPACE INC.

Shibata Group, #7 Building 4-5F, 2-21-11 Hatchobori, Chuo-ku
Tokyo, 104 JAPAN
(03)3555-3621; fax: (03)3555-3627
46 employees; 1993 projected revenues: \$40,000,000
■Tomoo Nakayama, President and Chief Executive Officer; Nobuyuki Usui, Manager of EPIRB
■Markets CEIS-Espace EPIRB search and rescue satellite and ground-based systems and mobile satellite communications service.

JAEGER INDUSTRIAL COMPANY

2F No. 4, Lane 7, Pao Kao Road, Hsin Tien City
Taipei, 231 TAIWAN
(2)913-3422; fax: (2)917-8362
■Eric Show, President; Gary Wu, General Manager
■Provides actuators, receivers, positioners (antenna, receiver and dual axis), and mounts.

JAPAN AIRCRAFT MANUFACTURING COMPANY LTD.

3175 Showa-Machi, Kanazawa-ku
Yokohama, 236 JAPAN
(04)5773-5111; fax: (04)5771-1807
Year established: 1949; 1,710 employees; area served: USA
■Mesanao Horie, General Manager; Atsumasa Kubota, Managing Director; Kanji Sonoda, President; Hiroshi Hosho, Director; Akira Obata, General Manager of Engineering Division; K. Koids, Senior Manager of Material Department
■Manufactures launch vehicle tail fuselages and fins and satellite structures.

JAPAN AVIATION ELECTRONICS INDUSTRY LTD. — AEROSPACE SALES DIVISION

21-6 Dogenzaka 1-chome, Shibuya-ku
Tokyo, 150 JAPAN
(03)780-2926; fax: (03)780-2945
2,700 employees
■Yoshiharu Fukunaga, Vice President and General Manager
■Manufactures and supplies inertial measurement units, inertial sensor packages, high performance accelerometers to the Japanese space industry.

JAPAN RADIO COMPANY LTD.

Akasaka Twin Towers (Main), 17-22, Akasaka 2-chome, Minato-ku
Tokyo, 107 JAPAN
(03)3584-8836
■Manufactures telecommunications equipment. Provides microwave radio communications equipment including maritime coast stations, multiplex links, cellular telephones, and base stations; satellite communications terminals include Inmarsat A/C/M and regional satellite earth stations and VSAT. Systems integration using communication, computer and telemetry/telecontrol technologies; and industrial and marine electronics.

JASMINE INTERNATIONAL COMPANY LTD.

333 Laksi Plaza, 6th Floor, Tower 2, Chaengwatana Road Don Muang
Bangkok, 10210 THAILAND
(2)576-0200; fax: (2)576-0198
■Suraphol Chanpetch, Chief Technician
■Provides VSAT products and systems.

JAVE YUAN ELECTRIC WIRE COMPANY LTD.

No. 122 Ping Ho Road, Chung Ho City, P.O. Box 698 Yung Ho
Taipei, TAIWAN
(2)223-6696; fax: (2)222-6190
■Manufactures coaxial cables.

JERROLD COMMUNICATIONS

General Instrument Corporation, Level 36, Hong Laong Building, 16 Raffles Quay
Singapore, 0104 SINGAPORE
322-8552; fax: 225-9060
■Benny C. H. Chan, Regional Director for Asia-Pacific
■Manufactures CATV and SMATV equipment.

JUNG ANG ELECTRONICS COMPANY

310-68, 4-Ka, Ulji-Ro, Chung-ku
Seoul, KOREA
(02)279-6417; fax: (02)272-5362
■Bong Duk Byun, President
■Provides electronic equipment and consulting services.

KALYANI MERCANTILE COMPANY

17 Garden Society, Gangapur Road
Nasik, 422 002 INDIA
253-70089; fax: 253-71600
■Mukund Holkar, Executive Director
■Provides antennas, receivers, feedhorns, and LNBs; technical consulting.

KANTO AIRCRAFT INSTRUMENT COMPANY LTD.

1-2 Hon-Fujisawa 4-chome, Fujisawa-shi
Kanagawa-ken, 251 JAPAN
(466)813311; fax: (466)830041
207 employees
■Kiichi Suzuki, President
■Manufactures reference gyro systems for Inmarsat ship earth stations.

KARACHI SCIENTIFIC SOCIETY

P.O. Box 6201
Karachi, 74000 PAKISTAN
714 501
Year established: 1985; 500 employees; 1993 projected revenues: 50,000,000; area served: Asia; ownership: private
■M. R. Sangji, President; S. B. Gheewala, Director of Production and Purchasing; G. A. Ahmedabadi, Chief Financial Officer; P. A. Noorani, Director of Marketing; T. M. H. Bhimani, Director of Sales; E. H. Ali, Technical Director

■Distributes adapters, amplifiers (high power, IF, klystron, low power, RF, servo, SSPA, and TWT), analyzers, antenna accessories and equipment, antenna protection equipment, antennas (C-band, global receive and microwave), arrays, assemblies, batteries, bridges, coaxial cable, fiber optic cable, cancellers, network controllers, converters (low noise, UHF and VHF), correctors, data acquisition equipment, decoders, detectors, display systems, turnkey earth stations, engines, equalizers, FETs, filters (coaxial, low pass, microwave, and SAW), signal generators, lubricants, maritime navigational products, microwave equipment, signal modems and voice channel modems, monitors, motors, fixed antenna mounts, optronic equipment, atomic oscillators, power supplies, audio processors, automatic program equipment, receivers (audio, data, RF, time base, and video), antenna reflectors, relays, RF equipment, solid rocket boosters, rocket engines, semiconductors, array sensors, voltage sensors, surge protection systems, switches (coaxial, PIN, protection, RF, and video), synthesizers, RF terminals, and test equipment,

KAWASAKI HEAVY INDUSTRIES LTD.

World Trade Center Building, 4-1 Hamamatsu-Cho 2-Chome
Minato-ku, Tokyo 105 JAPAN
(03)3435-2131; fax: (03)3432-4759
2,470 employees
■Hiroshi Ohba, President; Masayuki Yokoyama, Director of Finance; Toshiya Kohama, Executive Managing Director of Marketing; Ryoza Tsutsui, Executive Managing Director; Akikazu Nakamura, Executive Vice President of Technology Group
■Manufactures test equipment for launch facilities.

KIRYUNG ELECTRONICS COMPANY LTD.

219-6 Garibong-dong
Guro-ku, Seoul, 150020 KOREA
(02)864-2411-5; fax: (02)864-1672
■S. K. Lee, President; H. K. Cha, Sales Manager
■Provides TVRO products and systems.

KOIL CORPORATION

805 Kukjac Building 39-1 Pildong-1-ko, Joong-ku
Seoul, KOREA
(02)271-0030; fax: (02)272-2562
Year established: 1984; 9 employees; area served: Korea; ownership: private
■Joon Y. Jo, President; Eun J. Cha, Treasurer; Hong C. Kim, Manager; Yung M. Lee, Assistant Manager; Seung C. Shin, Technical Advisor; Mike Lee, Assistant Manager
■Provides cinema, broadcasting station and satellite equipment.

KOMATSU ZENOAH COMPANY

2-142-1 Sakuragaoka, Higashiyamato
Tokyo, 207 JAPAN
(425)651971; fax: (425)653206
1,000 employees
■Hiroyuki Matsumura, President; Minoru Takemoto, Managing Director

■Manufactures aluminum casting for rocket engines.

LANNA SUPPLY COMPANY LTD.

49/16 Huay Kaes Road, A. Muang
Chiang Mai, 50000 THAILAND
(53)212-727; fax: (53)217925
■Wiroon Tangsakrit, Managing Director
■Distributes antennas, feedhorns, LNBs, and receivers.

LARSON & TOUBRO — POWAI WORKS

L&T House, Ballard Estate, P.O. Box 278
Bombay, 400038 INDIA
22-261-8181; fax: 22-262-0223
Year established: 1938; 22,000 employees; 1993 projected revenues: \$22,000,000,000; area served: international
■U. V. Rao, Managing Director and Chief Executive Officer; S. R. Subramaniom, Managing Director; A. M. Naik, Vice President of Operations
■Manufactures hardware for launch vehicles.

LAS KOMPANI PTY. LTD.

P.O. Box 391
Wewak, ESP, PAPUA NEW GUINEA
86-2448
■E. J. Hanson, Director
■Provides TVRO products and systems.

LEBLANC COMMUNICATIONS INC.

99-899 Iwaena Street, Suite 111
Aiea, HI 96701 USA
(808)488-2436
■Provides analog and digital microwave systems, earth stations, voice and data switching, premise cabling systems, industrial security and CCTV systems, paging systems, point-to-multipoint rural telephone systems, television transmitters, broadcast antennas and combiners, and towers for cellular, broadcast, microwave, and general communications systems. Offers inspection and maintenance services. Turnkey EF&I capabilities including engineering, project management, system installation, and commissioning.

LOGITECH

6-B Saeed Hai Road, M.A.C.H.S. P.O. Box 13024
Karachi, 75350 PAKISTAN
21-430-261; fax: 21-455-9956
■Nooruddin Ahmed, Chief Executive; Akbar Khan Qureshi, Manager; Shamimuddin Ahmed, Director of Engineering
■Manufactures antennas and receivers.

LOTUS CINE PVT LTD.

D-402, Defence Colony
New Delhi, 110024 INDIA
11-462-4983; fax: 11-462-4708
■Rajiv Tulshan, Director; Manoj Tulshan, Director
■Manufactures amplifiers and modulators. Provides antennas, feedhorns, LNBs, and splitters.

M/S KASSONICS

Pinto Apartments, Pe Jose Vas Road
Vasci de Gama GOA, INDIA
2146; fax: 834-513-508

■Alexander Fernandes, Partner

■Distributes antennas and headend equipment (CATV, MATV and TVRO).

M/S U.M.S. FACTORY (P.) LTD.

Gopal Bagh, 317 Avanashi Road
Colmbatore, 641 018 INDIA
422-213377; fax: 422-212760

■G. D. Gopal, Managing Director; Bobby Chengappa, Executive Director

■Manufactures receivers, antennas, modulators, linear actuators, feedhorns, channel mixers, and CATV products and accessories.

M/S VIVA INTERNATIONAL

2nd Floor Zaman Plaza, The Mall
Lahore, PAKISTAN
42-723-6311; fax: 42-722-6311

■Muhammad Usman, Chief Executive Officer; Muhammed Tariq, Marketing Manager

■Distributes receivers, feedhorns and LNBS. Provides consultancy.

MARUBENI CORPORATION

4-2, Ohtemachi 1-Chome, Chiyoda-ku
Tokyo, 100 JAPAN
(03)3282-9611; fax: (03)3282-4764

■Takashi Katoh, Assistant to General Manager of Aerospace Division

■Manufactures satellite communications equipment.

MASPRO DENKOH CORPORATION

Asada, Nisshin
Aichi-gun, 470-01 JAPAN
(52)802-2211; fax: (52)802-2200

■Provides TVRO products and systems.

MATSUSHITA ELECTRIC WORKS

2-15 Matsuba-cho, Kadoma City
Osaka, 571 JAPAN

■Provides TVRO products and systems.

SALIM MEHMUD

Cavish Court, A-35, Block 7-8, Sharah Faisal
Sindh, 75350 PAKISTAN
(21)442 068; fax: (21)436 777

Year established: 1989; 250 employees

■Ali Mohammad Dawood, Managing Director; Yunus Dawood, Director; Arif Dawood, Director; Younous Hussain, General Manager

■Distributes accelerometers, actuators, amplifiers (high power, klystron, low noise, low power, RF, servo, and TWT), antenna accessories and equipment, antenna protection equipment, antenna systems, (C-, Ku-, and X-band, microwave and VSAT), attenuators, batteries, fiber optic cable, compression systems, connectors, converters (CSUS, frequency and low noise), data collection systems, delay compensation units, demodulators, detectors, display systems, downconverters, earth stations (C-band and Intelsat-compatible), echo cancellers, encryption systems, SAW filters, frequency counters, signal generators, EIRP monitors, optronic equipment, power supplies, receivers (audio, frequency-agile, RF, SCPC, and video), satellite tracking and telemetry software, spectrum analyzers, TVRO systems, video source identifiers, VSAT microstations, VSAT products, and wide area networks.

MICRO VISION

16 U G People's Park
Colombo 11, SRI LANKA
446519; fax: 448857

■Q. F. Gunarathe, Engineer of Electronics; Upali Nugaliyadde, Director of Marketing

■Manufactures antennas (solid and mesh). Distributes LNB, receivers and feedhorns.

MICROELECTRONICS TECHNOLOGY INC.

1 Innovation Road II, Hsinchu Science-Based
Industrial Park, Hsinchu 30077 TAIWAN
(35)773-335; fax: (35)777-121

Year established: 1983; 737 employees; 1993 projected revenues: \$81,000,000; area served: international

■Chi-Chia Hsieh, President

■Provides TVRO products and systems.

MIDLAND ASIA LTD. LAND MOBILE RADIO

Room 1206 12/F Peninsula Center, 67 Mody Road,
Tsimshatsu East, Kowloon
Hong Kong, HONG KONG
761-3828; fax: 723-6807

■Richard L. Looney, President; Bud Parker, International Sales Manager; Ernie Krahenbuhl, International Marketing Manager

■Manufactures land mobile radios and accessories, including portables, mobiles, base stations, and trunking. Available in the bands 30-50 MHz, 66-88 MHz, 136-174 MHz, 403-430 MHz, 450-470 MHz, and 800 MHz.

MITSUBISHI CABLE INDUSTRIES LTD.

4-1 Marunouchi 3-chome, Chiyoda-ku
Tokyo, 100 JAPAN
(03)3216-1402

■Hayao Shigenar, President; Kenzo Heebg, International Sales Manager

■Manufactures metallic telecom cables and accessories as well as optical fiber. Also manufactures LAN products, LED lamps, laser fiber, and fiber source (both industrial and medical). Provides engineering, furnishing and installation services.

MITSUBISHI ELECTRIC CORPORATION

2-2-3 Marunouchi, Chiyoda-ku
Tokyo, 100 JAPAN
(03)218-2111

89,113 employees

■Moriya Shiki, President

■Manufactures electronics and electrical equipment.

MITSUBISHI HEAVY INDUSTRIES LTD.

5-1 Marunouchi 2-chome, Chiyoda-ku
Tokyo, 100 JAPAN
(03)3212-3111; fax: (03)3212-9865

44,871 employees

■Yotaro Iida, Chairman of the Board; Kenatro Aikawa, President

■Manufactures rocket satellite launch vehicles.

MITSUBISHI SPACE SOFTWARE COMPANY LTD.

World Trade Center Building, 4-1 Hamamatsu-cho
2-chome, Minato-ku
Tokyo, 105 JAPAN
(03)435-4726

319 employees

■Kazuaki Wakata, President

■Provides systems engineering for space development, including operational software.

MOBILE TELESYSTEMS INC.

Number 1 Innovation Road II, Hsinchu Science-Based
Industrial Park
Hsinchu, 30077 TAIWAN
(3)577-2580; fax: (3)577-7121

■Kenneth Homon, President; Shafiq Chaudhuri, Vice President of Sales and Marketing; George Corbin, Vice President of Engineering

■Provides engineering, manufacturing and services to Inmarsat satellite communications systems.

MODERN COMMUNICATIONS AND BROADCAST SYSTEMS PVT. LTD.

93 Madhuban Towers, Ellisbridge
Ahmedabad, 380006 INDIA
401821; fax: 02712; 20585

■Provides satellite antennas, feedhorns and receivers.

N.G. ELECTRONICS

B-249 Okhla Industrial Estate Phase I
New Delhi, 110020 INDIA
11-681-1625; fax: 11-681-9403

■Distributes receivers, splitters and equalizers.

■Provides satellite antennas, feedhorns and receivers.

NAGARE ELECTRONICS

386 M.H.B. Colony, Satpur
Nasik, 422 007 INDIA
253-71206; fax: 253-77213

■D. K. Nagare, Proprietor

■Manufactures LNAs (L-band), receivers, antennas, RF modulators, and field strength meters.

D. NAGATA COMPANY LTD.

Kobe Port, P.O. Box 233
Kobe, JAPAN
(78)331-6421

■ Provides TVRO products and systems.

NASDA — THE NATIONAL SPACE DEVELOPMENT AGENCY OF JAPAN

World Trade Center Building, 2-4-1, Hamamatsu-cho, Minato-ku
Tokyo, 105 JAPAN
(03)547-04111; fax: (03)343-62928

■ Masato Yamano, President; Takuji Yamagami, Director of External Relations Department; Hidenori Nagai, General Manager of Public Relations Office
■ Develops and implements the Japanese national space development program. Operations include developing, launching and tracking H1-H2 launch vehicles and satellites. Promotes space experiments.

NATIONAL SPACE COUNCIL

106 Ho-ping East Road, Section 2, 22nd Floor
Taipei, TAIWAN

■ Mei-Zong Wu, Senior Researcher

■ Provides analysis and evaluation of national space policy.

NATIONAL SPACE SOCIETY OF AUSTRALIA

G.P.O. Box 7048

Sydney, NSW 2001 AUSTRALIA

(2)661-9100

Year established: 1990; area served: Australia; ownership: public

■ Kirby Ikin, President; Glen Nagle, Executive Director

■ Association promoting space development and education. Industry liaison.

NEC CORPORATION

7-1, Shiba 5-chome, Minato-ku

Tokyo, 108-01 JAPAN

(03)3454-111

Year established: 1899; 128,320 employees

■ Supplies communications systems and equipment, computers and industrial electronics systems, electron devices, and other electronic products.

NECOMPTE. LTD.

151 Chin Swee Road, Suite 09-01, Manhattan House

Singapore, 0316 SINGAPORE

732-2001; fax: 732-7451

Year established: 1977; 5 employees; 1993 projected revenues: \$2,500,000; area served: Singapore and Malaysia; ownership: private

■ Y. K. Ng, President; Peter Yoo, Accountant; Rick Ng, Sales Director; W. L. Loh, Systems Consultant; J. B. Yeo, Office Manager

■ Telecommunications services, including installation and service of satellite earth station equipment, data communications equipment and test systems.

NIPPON OIL AND FATS COMPANY LTD.

1-10-1 Yurakucho, Chiyoda-ku

Tokyo, JAPAN

(03)3283-7089; fax: (03)3283-7120

Year established: 1949; 2,912 employees; 1993 projected revenues: 135,745,000 Y; area served: Japan, USA and Europe

■ Kineo Okamoto, President and Chief Executive Officer; Soichu Kohayashi, Director; Ichiro Kamishima, Vice President; Masoshi Shinohara, Senior Managing Director; Tadashi Kurihara, Director

■ Manufactures electro-explosive devices for satellite launch vehicles.

NIPPON TELEGRAPH AND TELEPHONE CORPORATION (NTT)

International Affairs Department, 1-1-6, Uchinasaiwai-cho, Chiyoda-ku

Tokyo, 100 JAPAN

(03)3509-3253

Year established: 1952

■ Provides telecommunications services.

NISSAN AEROSPACE ENGINEERING COMPANY LTD.

5-1 Momoi 2-Chome, Suginami-ku

Tokyo, 167 JAPAN

(03)3301-6740; fax: (03)3399-5544

90 employees; 1993 projected revenues: \$5,830,000

■ Iwao Nakamura, President

■ Provides designs supporting rockets and other aerospace components; production engineering.

NISSAN MOTOR COMPANY LTD.

17-1, Ginza 6-chome, Chuo-ku

Tokyo, JAPAN

(03)3543-5523; fax: (03)3543-5941

55,566 employees

■ Yutaka Kume, Chairman; Yoshifumi Tsuji, President

■ Manufactures launch vehicles, sounding rockets, defense rocket systems, rocket engines, rocket launchers, guidance and control systems, and test equipment.

NISSAN MOTOR COMPANY LTD. — AEROSPACE DIVISION

5-1 Momoi 3-chome, Suginami-ku

Tokyo, JAPAN

(03)3301-6610; fax: (03)3301-6714

883 employees

■ Akio Shinohara, Managing Director and General Manager; Shinichi Yamazaki, Deputy General Manager

■ Manufactures satellites and satellite launch vehicles, sounding rockets, rocket engines, boosters, rocket launchers, guidance and control systems, and test equipment.

NYRON COMMUNICATIONS INC.

2F., 521 Sec. 5, Chung Shan N. Road

Taipei, 11120 TAIWAN

(2)882-1257; fax: (2)882-2857

■ N. R. Wang, Managing Director

■ Manufactures antennas, receivers, feedhorns, polarizers, LNBs, and TVRO systems.

O'CONNOR'S ENGINEERING AND TRADING (MALAYSIA) BHD.

Wisma O'Connor, 1 Jalan 219, Selangor Darul Ehsan

Petaling Jaya, 46100 MALAYSIA

(03)7566599; fax: (03)7556017

Year established: 1959; 408 employees; 1993 projected revenues: 113,024,819 RM; area served: Malaysia; parent: Wearne Brothers Ltd.

■ Lee Geok Tian, Managing Director; Koh Kia Heong, Division General Manager, Finance & Administration; Eddy Chong Kock Sang, Division General Manager of Mobile and Telephone; James Leong Tiu Kong, Technical Division General Manager

■ Trading in telecommunications, test measuring, scientific, professional audio-visual, broadcast, security system, lighting, office automation, and home and car audio and mobile phones.

OHBAYASHI CORPORATION

3, 2-chome, Kanda Tsukasa-cho, Chiyoda-ku

Tokyo, JAPAN

(03)292-1111

9,991 employees

■ Yoshiro Ohbayashi, President

■ Constructs combustion test facilities for solid rocket boosters and launch sites. Provides environmental assessments for rockets; motor combustion testing.

OPAC PTY. LTD.

99-105 Boundary Road, Peakhurst

Sydney, NSW 2210 AUSTRALIA

(2)584-1233; fax: (2)584-1452

■ Manufactures C- and Ku-band antennas from 4.5-meters to 13.4-meters, including automatic tracking, linear or circular re-use feeds, receivers, and head-end accessories.

OPTOMECH ENGINEERS PVT. LTD.

3A Type II, I.E. Kukatpally, Hyderabad

Andhra Pradesh, 500037 INDIA

842-278-917; fax: 0425-8088 OPTO IN

Year established: 1983; 30 employees; 1993 projected revenues: 10,000,000 R; area served: India; ownership: private

■ Alok Garg, Managing Director; P. P. Sastry, Director; Bsn Iyengar, President

■ Manufactures optical reflecting projection, multi-band SPOT ATM-compatible ground truth radiometers, projection compositors, and scanning stereoscopes.

P.T. KWINTERCOM

Jalan Gunung Sahari 96, Jakarta

Pusat, INDONESIA

380-2030

■ Distributes TVRO products and systems.

PACE MICRO TECHNOLOGY

Suite 113 Central Building, 1 Peddler Street

Central Hong Kong, HONG KONG

841-7809; fax: 841-7722

■ Keith Wiggins, Group General Manager of Sales and Marketing

■Manufactures SMATV systems, integrated receiver/decoders, satellite receivers, decoders, and antenna positioners.

PACIFIC SATELLITE INTERNATIONAL LTD.

161 E. Block B Cheung Lee Industrial Building, 9 Ehung Lee Street

Chai Wan, HONG KONG

898-1909; fax: 558-0406

Year established: 1989; 50 employees; area served: Hong Kong, Asia and Middle East; ownership: private

■Joseph Yeung, Managing Director; Mr. Andy, Chief Financial Officer; Vincent Tsang, Marketing Contact; Albert Laurel, Sales Contact; Gerry Ching, Technical Contact; Nora Yeung, Purchasing Contact

■Sells satellite receivers and accessories. Installs satellite systems in Hong Kong, China, Philippines, and other countries. Designs and consults on satellite equipment installation.

PACIFIC TELECOMMUNICATIONS COUNCIL

2454 South Beretania, Suite 302

Honolulu, HI 96826 USA

(808)941-3789; fax: (808)944-4874

Year established: 1980; 7 employees; area served: Pacific Rim

■Richard Barber, Executive Director; James Savage, Assistant Director; Peter Branson, Director of Service Provision

■Conducts annual telecommunications forums and periodic seminars. Promotes informational exchanges among 410 members. Publishes quarterly review.

PAKISTAN SPACE & UPPER ATMOSPHERE RESEARCH COMMISSION

Sector 28, Gulzar-e-Hijri, P.O. Box 8402, Off University Road

Karachi, 75270 PAKISTAN

(21)470 158; fax: (21)496 0553

Year established: 1961; 220 employees

■Hafiz Bhandari, Secretary; Sikahdar Zaman, Chairman; M. Ishaq Mirza, Member of Space Research; Abdul Majid, Member of Space Electronics; M. Zafrul Hasan, Secretary; Firozuddin Ahmed, Member of Finance; Mahmood Ali Khan, Director of Supply and Procurement

■Agency responsible for executing the Pakistani national program on space research and space technology, including the development of low-earth experimental satellites for scientific applications and the establishment of satellite ground receiving stations; ionospheric research.

PALCOM ELECTRONICS CORPORATION

157-2 Iida-Cho

Hamamatsu-shi, Shizuoka-ken JAPAN

(53)465-7231; fax: (53)465-5043

■A. Enokiya, President; T. Sugure, Director

■Provides TVRO products and systems.

PANASIAN SYSTEMS LTD.

LG4 Cavendish Centre, 23 Yip Hing Street

Wong Chuk Hang, HONG KONG

873-9777; fax: 555-1589

■George So, Regional Sales Manager

■Distributes SMATV, TVRO and CATV system equipment and engineering services.

PHILIPS SINGAPORE

510 Thomson Road, #10-02 SLF Building

Singapore, 1129 SINGAPORE

258-6801; fax: 258-6213

■W. Huisman, President; H. Vander Boon, International Sales Manager; F. B. Van, International Marketing Manager; C. J. J. De Wit, General Manager

■Supplies telecom network systems (microwave transmission, subscriber access systems, network management systems, public datacom and multi-service networks, cable transmission systems, and video and multi-media access systems). Provides private mobile radio, cellular (base stations and handsets) and pagers; integrated digital PBXs and key systems as well as private ISDN networks; digital cordless telephones, navigation and satellite communications and smart cards with matching readers/encoders. Engineering, furnishing and installation services available.

PREFORMED LINE PRODUCTS

109, Jalan 14/58

Petaling Jaya, Penin 46100 MALAYSIA

(03)776-4025; fax: (03)775-2868

■J. R. Ruhlman, President; G. W. Meldrum, International Vice President

■Manufactures cable fittings for copper, fiber optic and CATV cables in aerial or underground installations. Products include splice closures, terminations, splices, supports and suspensions, and optoelectronic products.

PT CITRA SARI MAKMUR

Chase Plaza 16/F, JL Jend Sudirman Kav 21

Jakarta, 12910 INDONESIA

21-570-6399; fax: 21-570-4656

Year established: 1989; 110 employees; 1993 projected revenues: \$8,000,000; area served: Asia Pacific; ownership: private

■Wirjoatmodjo Subajio, President Director; Ralph Tozier, Managing Director; Said Sungkar, Marketing Manager; Rafael Gafar, Engineering; M. Sutoyo, Operations; P. L. Tobing, Purchasing; Rulianto Soeharjo, Administration Manager; Adjie Rukmantara, Engineering Support Manager; Sulaksono Tedjo Pawoko, General Manager of Finance and Purchasing

■Provides VSAT installation and maintenance.

PYRAMID RESEARCH INC.

68 Upper Serangoon Road

Singapore, 1334 SINGAPORE

283-6672; fax: 285-2061

■William Ambrose, President; Achmad Chadran, Senior Associate

■Specializes in the analysis of markets, strategies and competitive environments in Asia, Africa, Latin America, Eastern Europe/C.I.S., and the Middle East. Publications and custom research providing analysis of technology trends, privatization and liberalization trends, PTT and operator network strategies, network development strategies, supplier marketing strategies, distribution strategies, and manufacturing and technology transfer strategies.

PYROCHEM F.R.P. COMPANY LTD.

P.O. Box 42-113, 79 Chung-King North, 7th-9th Floors

Taipei, Taiwan CHINA

(2)811-7662; fax: (2)811-5498

■Kevyn Kennedy, Sales Department; Sherry Chang, Sales Department

■Produces satellite antennas from 45 cm to 180 cm in diameter, horizon-to-horizon mount and 6-inch solid aluminum antenna.

RADAC PTY. LTD.

Block 514, Chai Chee Lane, #07-15, Bedok Industrial Estate

Singapore, 1646 SINGAPORE

443-8277; fax: 242-6739

75 employees; 1993 projected revenues: \$10,000,000; area served: Asia

■S. P. Quek, Chairman; Helen Yeow, Director; Patrik Hia, Director; Gilbert Tan, Director; K. K. Tan, Director; P. H. Lan, Manager

■Provides satellite services including modem, VSAT, earth station, and system integration.

RADIO FREQUENCY SYSTEMS

36, Garden Street

Kilsyth, VIC 3137 AUSTRALIA

(3)728-1777; fax: (3)728-4544

■Chris Jaeger, President; James Kee, International Sales and Marketing Manager

■Devoted to the research, development, manufacture, installation, and maintenance of antennas and ancillary equipment for the commercial, broadcasting, PTT, and defense radio communications industries.

RADIO RESEARCH LABORATORY

Ministry of Communications, 1215 Communications Centre, 100 Sejong-Ro, Jongro-Gu

Seoul, KOREA

(02)750-2352; fax: (02)750-2354

■Jai-Lim Yuk, Chief of Radio Waves Division

■Provides satellite consultancy.

R.F. INDUSTRIES LTD.

23 O'Connell Terrace

Brisbane, QLD AUSTRALIA

(7)252-7600; fax: (7)252-5505

■S. R. Jaques, President; Kevin Booker, International Sales Manager

■Manufactures and supplies antennas and associated equipment to land mobile radio, marine and cellular marketplaces. Offers a package including base station antennas and cables, transmitter and receiver multicoupling equipment, lightning protection systems, and solar power systems.

SKAWOL LTD. — HONG KONG

G/F, 12-14 Sam Chuk Street, San Po Kong
Kowloon, HONG KONG
351-6381; fax: 351-5607

■Choi Oi Lai, Group Managing Director; Choi Oi Wing, Managing Director

■Distributes actuators, antennas, cables, feedhorns, LNBs, receivers, and TVRO equipment.

SKY SAT LTD.

786/37 Thanglor Tower, Soi Thonglor Soi,
Sukumwit 55

Bangkok, 10110 THAILAND
(2)381-8054; fax: (2)322-3480

■Jay C. Adair, Executive Director; Pilanya Plookchareon, Managing Director

■Provides television programming distribution and consulting.

SKYDATA INC. — A DIVISION OF THE SAMSUNG COMPANY

G.P.O. Box 1144

Seoul, KOREA

(02)751-2544-6; fax: (02)751-2776

■John R. Todd, President; Pat Faris, International Sales Manager; Joseph Lee, International Marketing Manager

■Manufactures and distributes a line of RF receivers, RF terminals, SNG products, and turnkey systems for C- and Ku-band data, voice and video applications. Engineering, furnishing and installation services available.

SKYWAVES

71 Laxmi Niwas, Ground Floor, Road Number 25,
Sion (W)

Bombay, INDIA

407-5960; fax: 407-2240

■Manufactures CATV products.

SOCIETY OF JAPANESE AEROSPACE COMPANIES INC.

Hibiya Park Building, Room 518, 8-1 Yuraku,
Chiyoda-ku

Tokyo, 100 JAPAN

(03)3211-5678; fax: (03)3211-5018

Year established: 1952; 40 employees

■Naomi Anesatei, President; Milei Sugiura, General Manager of International Affairs; Isamu Kawai, Chairman; Hiroo Fujiki, Vice President of Research and Investigation; Hidejiro Yamada, Executive Vice President

■Trade association promoting the aerospace industry.

SOUTHSAT COMMUNICATIONS LTD.

245 Barbadoes Street

Christchurch 1, NEW ZEALAND

377-2507; fax: 379-0806

■Gary McNeill, Director

■Manufactures antennas.

SPACE ASSOCIATION OF AUSTRALIA

P.O. Box 351

Mulgrave North, VIC 3170 AUSTRALIA

(3)772-5804

Year established: 1981; area served: Australia

■John Coleman, President; Geoff Alshorn, Chief Financial Officer; David Standen, Sales Representative

■Promotes space programs.

SPACE ENGINEERING DEVELOPMENT COMPANY LTD.

EDC Building, 62-1 Nakano 5-chome, Nakano-ku

Tokyo, 164 JAPAN

(03)319-4001; fax: (03)319-6998

200 employees

■Eitaro Itch, President

■Provides launch services and satellite tracking control support.

SPACEGUARD PTY. LTD.

211 Victoria Square, 16th Floor

Adelaide, SA 5000 AUSTRALIA

(8)267-1793; fax: (8)233-1672

■Duncan Olsson-Steel, Director; John Hanson, Director

■Provides orbital debris hazard analysis and international space technology marketing.

SPAR COMMUNICATIONS GROUP

Wisma Budi, J1 Rasuna Said, kav. C-6, Lantanai 7,
#702

Jakarta, 12940 INDONESIA

21-850-8298; fax: 21-850-8343

■S. S. Kamal, President; Patrick Wong, International Sales Manager; Merritt Doyle, International Marketing Manager; Bill Evans, Asian Regional Service Manager

■Provides turnkey satellite telecom network equipment and systems integration. Hubless satellite communications network terminals supporting voice channels and data rates for high speed data applications.

SPC ELECTRONICS CORPORATION

2-1-3 Shibasaki Chome

Chofu-City, Tokyo 182 JAPAN

(424)81-8518; fax: (424)81-9696

■K. Ishizuka, Manager

■Provides TVRO products and systems.

SPOT IMAGING SERVICES

156 Pacific Highway

St. Leonards, NSW 2065 AUSTRALIA

(2)906-1733; fax: (2)906-5109

Year established: 1989; area served: South Pacific

■Distributes remote sensing data products produced by the SPOT series of satellites.

STAR VISION

77 Bai Nigayam, Brooke Bond Road, Colmbatore

Tamil Nadu, 641 001 INDIA

422-48373; fax: 422-212-957

■R. Dharani Kumar, Manager

■Distributes actuators, amplifiers, antennas, channel modulators, coaxial cable, feedhorns, LNBs, and receivers.

STRONG FAREAST

P.O. Box 85, Yokohama

Kanagaw-Ken, 231 JAPAN

(45)681-5841; fax: (45)651-1842

■Provides TVRO products and systems.

SUPERIOR COMMUNICATIONS

9th Floor, Wisma KLI, 126, Jalan Bukit Bintang

Kuala Lumpur, 55100 MALAYSIA

(03)242-8151; fax: (03)242-2052

■Abu Bakar Sharif, Executive Director; Zulkeflee Khalidin, Marketing Manager; Rokiah Abu Rasan, Business Development Manager

■Distributes modems and TVRO systems. Provides engineering services and system integration.

T.V. CHUNG ENTERPRISE COMPANY LTD.

Nan Hsing Road, No. 11, Lane 160

Nantou City, Nantou Hsien TAIWAN

(49)317111; fax: (49)350839

■Manufactures satellite antennas.

TAIWAN MICROWAVE COMMUNICATION COMPANY LTD.

Number 16 Prosperity Road 2, Hsinchu Science-Based Industrial Park

Hsinchu, TAIWAN

(35)781-380; fax: (35)781-386

■Ron Shih, Chairman

■Provides satellite antenna mounts.

TEE-COMELECTRONICS

315 Outram Road #15-05, Tan Boon Liat Building

Singapore, 0316 SINGAPORE

227-7335; fax: 227-7335

■Arthur Goldstein, Director of Operations for Asia-Pacific

■Manufactures and distributes satellite antennas, receivers (TVRO), coaxial cables, attenuators, LNBS, feedhorns, and related accessories.

TEKTRONIX INC.

22/F Dah Sing Financial Centre, 108 Gloucester Road

Hong Kong, HONG KONG

598-6260; fax: 598-6260

■Jerome Meyer, President and Chief Executive Officer; Arif Kareem, International Marketing Manager; Matthew Chan, Operations Manager; Meng Hee Teng, International Marketing Manager; Simon Tsang, ASEAN Sales Manager

■Manufactures test, measurement and monitoring equipment. Engineering, furnishing and installation services available.

TELE-COMELECTRONICS

315 Outram Road #15-05, Tan Boon Liat Building

Singapore, 0316 SINGAPORE

227-7335; fax: 227-7335

■Arthur Goldstein, Director of Operations for Asia-Pacific

■Manufactures and distributes satellite antennas, receivers (TVRO), coaxial cables, attenuators, LNBS, feedhorns, and related accessories.

TELE-DYNAMIC PTE. LTD.

Block 9010 Tampines Street 93 #03-107
Singapore, 1852 SINGAPORE

■Patrick H. M. Chang, President

■Provides materials for outside line plant such as cable closure systems, connectors, cable cleaners, and lubricants; air pressure monitoring and control equipment; telephone booths and enclosures; test equipment such as cable faults measuring sets; fiber optic talk sets; hand tools such as wire cutters; cable cutters (both hydraulic and ratchet) and cable splicing tents. Engineering, furnishing and installation services available.

TELECOM CORPORATION OF NEW ZEALAND

13-27 Momers Street, P.O. Box 570
Wellington, NEW ZEALAND
(4)382-3333; fax: (4)385-1766

■Thomas Burns, President; Don Sledge, International Sales Manager; Bill Doak, General Manager; Anthony Briscoe, Executive Director

■Provides domestic and international PSTN and mobile services, including cellular, paging and trunk radio. Undertakes institutional and network scoping, planning and evaluation; system design; installation and construction; project management; equipment procurement and evaluation; testing and calibration; operation and network management; repair and maintenance; training; customer services; and administration systems. Offers technical assistance, operational experience, management services, supervisory services and/or equity participation in outside plant projects, and inside plant and value-added network services.

TELECOM EQUIPMENT PTE.

20 Pickering Street, 3rd Storey
Singapore, 0104 SINGAPORE
532-7877; fax: 533-3579

■Tew Boon Kui, General Manager; Desmond Ee, Group Manager of Strategic Planning and Marketing; Derrick Tan, Group Manager of Business Communications; Yang Kian Giap, Group Manager of Radio Communications; Cheng Soo Sai, Group Manager; Leong Chan Cheong, Group Manager
■Specializes in integrating and managing telecommunications, office automation and building automation via information highways. Also provides voice and data networks and systems integration. Provides business communications systems including PBXs, keyphone systems, video conferencing systems, and premises cabling distribution systems. Products also include fax and telex machines, telephones, pagers, cellular mobile phones, and trunked repeater systems.

TELECOM REPAIR SERVICES

21 Lady Ruby Drive, East Tamare
Auckland, NEW ZEALAND
(9)274-3367; fax: (9)274-3366

■John Moriarty, President and International Sales Manager

■Repairs and supports a variety of equipment installed in most countries within Asia-Pacific. Specializes in repairing users' items and providing technical support.

TELECOMMUNICATIONS ADVANCEMENT ORGANIZATION OF JAPAN

Banzai Building, 2-31-19 Shiba, Minato-ku
Tokyo, 105 JAPAN

(03)769-6811; fax: (03)3452-7600

Year established: 1979; 100 employees; area served: Japan; ownership: public

■Moriya Koyama, President; Ikuro Izutsu, Division Director

■Launches and leases communications and broadcasting satellites.

TELECONNEX SATELLITE INC.

13 Bao Din Street
Taoyuan, TAIWAN

(3)338-8610; fax: (3)338-8546

■Tina Chiu, Marketing Manager

■Provides TVRO products and systems.

TELEMAX COMPANY LTD.

No. 603-2, Mok 3-Dong, Yangchun-ku
Seoul, 158-053 KOREA

(02)651-8112; fax: (02)652-3288

■Yong Man Kim, Managing Director; Jennie A. Ko, Export Manager

■Manufactures antenna positioners, receivers, LNBS, and satellite receiving systems.

TELSAT COMMUNICATIONS LTD.

P.O. Box 1537
Palmerston North, NEW ZEALAND
(6)355-2141

■Selwyn Cathcart, Managing Director; Terry Cathcart, Secretary

■Provides TVRO products and systems, consulting TVRO systems installation.

THAI NETWORK CENTER COMPANY LTD.

222/25 Langluang Road
Bangkok, 10100 THAILAND
(2)282-5286; fax: (2)281-6652

■Kiattichai Santhongprasert, Marketing Manager

■Manufactures antennas. Distributes antennas, feedhorns, LNBS, and receivers.

TOSHIBA CORPORATION

1-1, Shibaura 1-Chome
Minato-ku, Tokyo 105 JAPAN
(03)457-3077; fax: (03)456-1631

■Junichiro Shiraishi, Senior Manager

■Develops and manufactures spacecraft, spacecraft components, ground equipment, image processor, and software for satellite systems.

TOYO COMMUNICATION EQUIPMENT COMPANY LTD.

3-20-4 Nishi-Shinbashi, Minato-ku
Tokyo, 105 JAPAN

(03)3459-7320; fax: (03)3436-1434

Year established: 1938; 2,000 employees

■Kiyoshi Tada, General Manager of Satellite Equipment; Shinichi Itoh, Representative Director; Kazuhiro Ono, Director; Sieji Nakagome, Director; Kazuyuki Kita, Chief Manager; Toshikiyo Hirata, Senior Manager

■Manufactures antenna subsystems for satellite communications.

TRANSCOM

33 Electronic Cooperative Estate, Pune Satara Road
Pune, INDIA

432-438; 432-488; fax: 435-509

■S. M. Hardikar, Partner; U. V. Valdy, Partner

■Provides CATV/MATV headend and distribution equipment.

TRICOM COMPANY LTD.

912 Kangyon Hanshin Core Building 312, Mapo-Dong, Mapo-ku

Seoul, KOREA

(02)701-7084; fax: (02)719-2221

Year established: 1989; 23 employees; 1993 projected revenues: \$800,000,000; area served: Korea; ownership: private

■Sang-Koo Lee, President and Chief Executive Officer; H. Choi, Director; H. C. Ryu, Director; K. L. Kim, Executive Director; J. K. Oh, Research Manager; H. Choi, Director

■Sells and markets most telecommunications related products. Develops N-LSO CPEs and ATM products.

TUNEWELL ELECTRONICS PVT. LTD.

73-74 Parasrampur Tower-2, Lokhandwala, Andheri (W)

Bombay, 400058 INDIA

22-627-0416; fax: 22-627-0416

■Distributes CATV products.

UMS RADIO FACTORY PRIVATE LTD.

Avanashi Road, P.B. 3771, Coimbatore
Tamil Nadu, 641018 INDIA

042-221-3377; fax: 042-221-2760

Year established: 1970; 1,000 employees; 1993 projected revenues: RS. 60,000,000; ownership: private

■Bobby Chengappa, Executive Director; N. K. Anantaraman, Marketing Director; G. D. Gopal, Managing Director; P. Sridharan, Manager of Finance; K. Ramachandran, Sales Manager

■Manufactures and distributes C- and S-band systems including dish antennas, LNCs and receivers.

UNIPLAST INDUSTRIES

D-1 Atlas Mill Compound, 220 Reay Road
Bombay, 400 010 INDIA

22-372-1861; fax: 22-378-2644

■Aslam Abdul Hamid, Partner; Abdul Qayyum, Partner

■Manufactures coaxial cable.

UNITED SATELLITE AND RADIO SYSTEMS

257 Quirino Avenue, Tambo, Paranaque
Metro Manila, PHILIPPINES
(2)831-2676; fax: (2)831-2676
■J. M. Dabao, Proprietor; R. S. de la Victoria, Manager
■Provides antennas; headends; TVRO receivers; TVRO, CATV and SMATV installation and consulting.

UNIVERSITY COPY SYSTEMS OF HAWAII INC.

2344 Kam Highway
Honolulu, HI 96019 USA
(808)847-0777
■Distributes Canon products and systems.

VECCOM COMPANY LTD.

2-9 Nanyuan Road
Taoyuan Hsien, TAIWAN
(3)341-5217; fax: (3)451-5216
■Kerl Yen, President; Landsten Chu, Planning and Control Manager
■Provides TVRO products and systems.

VICT INTERNATIONAL CORPORATION

3F, Number 239, Chung Ching N. Road, Sec. 4
Taipei, TAIWAN
(2)8161926; fax: (2)816-1925
■Distributes TVRO, CATV and SMATV products and equipment.

VIDEOSHACK SYSTEMS LTD.

18-D Industrial Area
Rawalpindi, PAKISTAN
51-861-955; fax: 51-862-217
■T. Jilani, Managing Director
■Manufactures antennas, feedhorns and receivers.

WARD

Century Building, 325-1 Nakashinkai
Higashiosaka City, 578 JAPAN
(729)65-0606; fax: (729)63-0220
■Provides TVRO products and systems.

WAVETECH LTD.

C-31, KDA Scheme No. 1
Karachi, 75350 PAKISTAN
(21)447 779; fax: (21)241 5632
Year established: 1985; 72 employees; area served: Asia, Middle East, Africa, and Australia
■Altamash Kamal, Chief Executive; M. Hanif, Chief Financial Officer; Zafar Qureshi, Marketing Representative; Imran Siddique, Sales Representative; Ahmed Fraz, Technical Representative; Nasir Arain, Purchasing Contact
■Provides TVRO products and systems, satellite tracking products, research and development, technical consulting, software development, block conversion receivers, positioners, motorized mounts, C- and S-band earth stations, feed horns, and global receive antennas.

WELLBE COMPANY LTD.

Flat A 19/E Hyde Centre 221-226, Gloucester Road
Wanchai, HONG KONG
839-2181; fax: 838-1525
Year established: 1988; 6 employees; 1993 projected revenues: \$1,200,000; area served: China and Hong Kong; ownership: private
■Y. Y. Wong, Director; Kwok Chui King, Director; Karen Wong, Manager
■Provides satellites and microwave communications.

WESTRONIC AUSTRALIA LTD.

88 Welshpool Road
Welshpool, 6106 AUSTRALIA
(9)470-2088; fax: (9)470-3406

■Tim Morris, Managing Director; Sheldon Moore, International Sales Manager

■Provides remote monitoring and control equipment for telecommunications networks involving complex arrays for fiber optic and microwave transmission facilities, satellite stations, switches, and customer premises equipment.

WINNERS SATELLITE ELECTRONICS CORPORATION

3F Number 4 Lane 263, Chung Yang Road
Taipei, 11527 TAIWAN
(2)780-0711; fax: (2)782-8490
■Anderson Chang, Sales Manager
■Manufactures TVRO equipment.

YAGI ANTENNA

1-6-10 Uchikanda, Chiyoda-ku
Tokyo, 101 JAPAN
(03)3292-7524; fax: (03)3292-7625
Year established: 1952; 600 employees; 1993 projected revenues: \$209,000,000; area served: Japan; parent: Hitachi Group; ownership: private
■Tatsuo Takeuchi, Manager; Kimio Takahashi, President; A. Tomonaga, Director of Financing; Shun Satoh, Technical Director
■Manufactures Ku-band antennas, receiver feeds and filters.

THE YASUDA FIRE AND MARINE INSURANCE COMPANY LTD.

1-26-1 Nishi-Shinjuku, Shinjuku-ku
Tokyo, JAPAN
(03)3349-4032; fax: (03)3348-0395
Year established: 1888; 12,220 employees; 1993 projected revenues: \$1,249,000; area served: international
■Koichi Arlyoshi, President; Tastuya Suzuki, General Manager of Aviation & Aerospace Department
■Provides satellite insurance and insurance plans for space development.

SECTION 6

SATELLITE SERVICE PROVIDERS

Included in This Section:

This section contains companies that lease and/or sell transponder capacity, provide satellite-delivered voice, data, video, and integrated transmission services, as well as companies that provide satellite audio and teleconferencing/business television services. A typical listing contains the following elements:

1. Company name, address and telephone and fax numbers;
2. Year established, number of employees and geographic area served;
3. Estimated 1993 revenue;
4. Listing of key personnel;
5. Summary of services.

How to Use This Section:

Companies are arranged alphabetically by country, then by city, then by company name.

SATELLITE SERVICE PROVIDERS

AUSTRALIA

Q-NET PARTY LTD.

Unit 18 2F, Bowen Gate, Corner Bowen Bridge Road and Campbell Street
Bowen Hills, QLD 4029 AUSTRALIA
(7)832-4499; fax: (7)832-1828
■Provides satellite services.

SPACE ASSOCIATION OF AUSTRALIA

P.O. Box 351
Mulgrave North, VIC 3170 AUSTRALIA
(3)772-5804
Year established: 1981
■John Coleman, President; Geoff Alshorn, Chief Financial Officer; David Standen, Sales Representative
■Provides news feeds and audio and radio transmission services.

OTC LTD.

231 Elizabeth Street
Sydney, NSW 2001 AUSTRALIA
(2)287-5000; fax: (2)287-5031
■Provides satellite services.

HONG KONG

ASIAVISION LTD.

1101 Ruttonjee House, 11 Duddell Street
HONG KONG
525-5751; fax: 523-5682
■Urban Carmel, Director
■Provides news feeds to broadcasters in the Asia-Pacific region.

HONG KONG TELECOM INTERNATIONAL

G.P.O. Box 597
HONG KONG
(58)291 271; fax: (58)291 752
■Provides satellite services.

HONG KONG TELECOM PRIVATE NETWORK SERVICE MANAGEMENT

G.P.O. Box 9896
HONG KONG
883-3146; fax: 824-1795
15,000 employees
■Phillip Mul, Product Manager of Satellite Services; W. K. Yeung, Satellite and Radio Manager; Mike Gale, Chief Executive
■Provides satellite services. Equipment and capabilities include 10 earth stations accessing Intelsat POR, IOR and regional satellite systems.

SATELLITE TELEVISION ASIAN REGION LTD. -- STAR TV

10 Harcourt Road
HONG KONG
532-1888; fax: 524-4093
Area served: Asia Pacific and Middle East
■Paul Edwards, Executive Vice President of Pay TV; Michael Dunlop, Executive Vice President of Free-to-air TV; Jim Griffiths, Managing Director
■Provides free-to-air channels.

INDIA

BHARAT ELECTRONICS LTD.

Trade Centre 116/2 Race Course Road
Bangalore, 560001 INDIA
812-269-897; 812-267-322; fax: 812-265-657; 812-268-410
Year established: 1954; 20,000 employees
■V.K. Koshy, General Manager of International Marketing; P. D. Modak, Chairman and Managing Director; J. I. Devadatta, Financial Director; G. S. Chandraskharan, Director of C & MS; J. J. Bazi, Director of Research and Development
■Offers fixed uplink/downlink services.

INDONESIA

PT ABHIMATA CITRA ABADI

JL Gunung Sahari Raya, No. 60-63, Block E-8
Jakarta, 10610 INDONESIA
21 420 5441; fax: 21 420 5440
Year established: 1989; 80 employees
■Susanto Suwanto, President and Director; Dir Lucky, Director; Indra Djaya, General Manager; Quntoro, Product Manager; Susanto Chandra, Technical Manager; Acu, Manager of Purchasing
■Transmission services with complete earth station services and Palapa satellites.

PT CITRA SARI MAKMUR

Chase Plaza 16/F, JL Jend Sudirman Kav 21
Jakarta, 12910 INDONESIA
21 570 6399; fax: 21 570 4656
■Wirjoatmodjo Subajio, President Director; Ralph Tozier, Managing Director; Said Sungkar, Marketing Manager; Rafael Gafar, Engineering; M. Sutoyo, Operations; P. L. Tobing, Purchasing; Rulianto Soeharjo, Administration Manager; Adjie Rukmantara, Engineering Support Manager; Sulaksono Tedjo Pawoko, General Manager of Finance and Purchasing
■Provides satellite services. Equipment and capabilities include, VSAT system, hub and remote terminal for data communications services, second SCPC link for voice, fax, and data. Accesses PALAPA B2\$ (108° W.L.) at 3-V transponder.

PT ELEKTRINDO NUSANTARA — SMARTCOM DIVISION

Bimantara Building 4/F, JL Kebon Sirih 17-19
Jakarta, 10340 INDONESIA
21 353 197; fax: 21 353 697
■Provides satellite services.

PT INDOSAT

JL Medan Merdeka Barat 21
Jakarta, 10110 INDONESIA
21 370 166; fax: 21 370 484
■Provides satellite services.

JAPAN

KOKUSAI DENSHIN DENWA COMPANY LTD.

2-2 Marunouchi 2-Chome
Chiyoda-Ku, Tokyo 100 JAPAN
(33)3240-8420; fax: (33)3240-8437
■Provides satellite services.

JAPAN BUSINESS TELEVISION INC.

3-3-13 Kitaoyama, Minato-Ku
Tokyo, 107 JAPAN
(3)470-3080; fax: (3)470-7593
■James Lloyd; Yasushi Furukawa, Assistant to President; K. Fujisaki, Managing Director
■Uplinking, downlinking and business and special events television. Domestic and international video network services. Data and facsimile transmission, production and post production.

JAPAN COMMUNICATIONS SATELLITE COMPANY INC.

Shiroyama J.T. Mori Building, 27th Floor, 4-3-1, Toranomon, Minato-ku
Tokyo, 105 JAPAN
(03)5400-3700; fax: (03)3437-6620
Year established: 1985; 127 employees
■Y. Nakayama, President; N. Hasegawa, General Manager of Marketing Division; J. Beitchman, General Manager of Engineering Department; Y. Iwamura, General Manager of Controllers Department
■Provides transmission capacity for video, voice and data transmission services via satellite. Also provides full period and part-time full transponder leases as well as full period and partial transponder leases.

TRW OVERSEAS INC.

Maekawa-kuden Building, 2-3-7, Kydankita, Chiyoda-Ku
Tokyo, 102 JAPAN
(03)3234-8892; fax: (03)3234-9036
■Nobi Arino, Executive Managing Director of Space Systems

■Offers international satellite services over the Atlantic and Pacific Rim ocean regions on the Columbia/TDRS satellite systems. Transponder services include international transmission of audio and video broadcast and cable programming.

KOREA

DATA COMMUNICATIONS OF KOREA

Dacom Building, Ga Han Gang-Ro, Yongsan-ku Seoul, 652283 KOREA
(02)796-6200; fax: (02)796-8500
■Provides satellite services.

KOREA TELECOM SATELLITE BUSINESS GROUP

Kangdong-gu, 46-3 Myungil-Dong Seoul, 134070 KOREA
(02)441-4693
■Provides satellite services.

MALAYSIA

RADAC MALAYSIA LTD.

Level 1, Block B, Kompleks Pejajar, Damansara, Jalan Dungun
Damansara Heights, Kuala Lumpur 50490 MALAYSIA
3 254 3133; fax: 3 255 2078
■Provides satellite services.

TELEKOM MALAYSIA BERHAD

15th Floor Bangunan Bukit, Jalan Pantai Baru Kuala Lumpur, 59200 MALAYSIA
3 232 9494; fax: 3 755 7316
Year established: 1987; 700 employees
■Harold Read, Senior General Manager; Sharifah Naemah Syed Alwi, Unit Head; Yee Fook Hin, Unit Head; Tengku Ismail, General Manager
■Provides satellite services. Equipment and capabilities include FDM, TDMA, SCPC, IBS, and television transmission and reception. Accesses Intelsat and Palapa satellites.

TELEKOM MALAYSIA STM HEADQUARTERS

Wisma Telekom, Jalan Pantai Baharu Kuala Lumpur, 59200 MALAYSIA
3 239 2374; fax: 3 755 7316
■Provides satellite services.

PHILIPPINES

GLOBE TELECOM

669 United Nations Avenue Ermita Manila, PHILIPPINES
(632)5213550; fax: (632)5217225
360 employees
■Mark A. Javier, President; Flaviano L. Famos, Chief Financial Officer; Angelo C. Molato, Vice President; William L. Velasco, Assistant Vice President; Carlo C. Castelo, Vice President
■Provides satellite services.

EASTERN TELECOMS TELECOMS PLAZA

316 Sen. Gil J. Puyat Avenue, Selcedo Village Makati (Metro Manila), PHILIPPINES
(2)815-8921; fax: (2)817-9742
■Provides satellite services.

MACROTEL SYSTEMS INC.

303 Oledan Building, 131 Ayala Avenue Makati (Metro Manila), PHILIPPINES
(2)817-2647; fax: (2)817-2663
■Provides satellite services.

PHILCOMSAT

Telecoms Plaza, 316 Sen. Gil J. Puyat Avenue Makati (Metro Manila), PHILIPPINES
(2)815-8406; fax: (2)712-3400
■Provides transmission services.

PHILIPPINE GLOBAL COMMUNICATIONS

8755 Paseo de Roxas, Makati Avenue Makati (Metro Manila), PHILIPPINES
(2)817-0144; fax: (2)818-9720
■Provides satellite services.

PHILIPPINES LONG DISTANCE TELEPHONE COMPANY

12th Floor, Ramon Cojuangco Building Makati (Metro Manila), PHILIPPINES
(2)815-9605; fax: (2)815-1600
■Provides satellite services.

GMCR INC.

669 United Nations Avenue, Ermita Manila, PHILIPPINES
(2)521-3550; fax: (2)521-8136
■Aristotle Z. Elvina, Vice President of External Relations
■Provides digital data communications through its Intelsat Business Service.

INTERNATIONAL COMMUNICATIONS CORPORATION

G/F Chronicle Building, Meralco Avenue Pasig (Metro Manila), PHILIPPINES
(2)631-2447; fax: (2)632-1230
180 employees
■Eugenio Lopex, President; Primitivo T. Penaranda, Senior Vice President; Led Villaros, Vice President of Marketing; Roberto L. Duque, Vice President of Engineering & Operations
■Provides satellite services. Equipment includes Scientific Atlanta 10 meter earth station. Accesses the Palapa B2P satellite.

SINGAPORE

SINGAPORE TELECOM

31 Exeter Road, Comcentre 0923 SINGAPORE
738-5338; fax: 734-6896
■Provides satellite services.

TAIWAN

LINK COMMUNICATIONS TAIWAN INC.

2F 13, Industrial East Road 2, Science Based Industrial Park
30077 TAIWAN
(35)775 175; fax: (35)772 484
■Provides satellite services.

THAILAND

THE COMMUNICATIONS AUTHORITY OF THAILAND

12/46-48 Chaeng Watthana Road Bangkok, 10002 THAILAND
(2)573 2828; fax: (2)573 7093
■Aswin Saovaros, President; Yupin Benchakanchana, Director of Finance and Revenue Division; Prajin Kecharananta, Director of Commercial Division; Priti Hettrakul, Director of Satellite Division; Prasong Sukalanun, Director of Property and Supply Division
■Provides satellite services. Equipment and capabilities include IDR, TDMA/DSI and FDMA/FM TV broadcasting. Accesses Intelsat satellites located at 170, 60 and 66 degrees.

TELEPHONE ORGANIZATION OF THAILAND

Ploen Chit Road Bangkok, 10330 THAILAND
(2)255 0829; fax: (2)254 1884
■Provides satellite services.

SHINAWATRA COMPUTER AND COMMUNICATIONS COMPANY LTD.

526 Rama 5 Road Dusit (Bangkok), 10300 THAILAND
(2)241 2334; fax: (2)243 5822
■Provides satellite services.

SAMART CORPORATION LTD.

59 Moo 2 Paholyothin Road, Klong 1 Klonglaung Pathumthanee, 12120 THAILAND
(2)516 9327; fax: (2)516 1594
■Charoenrath Vilailuck, President; Urai Limcharoen, Chief Financial Officer; Kitivech Sudbuntad, Marketing and Sales Representative; Trevor Thompson, Technical Representative
■Provides satellite services utilizing the SA VSAT system. Accesses Palapa B2P 2 transponder.

COMPUNET CORPORATION LTD.

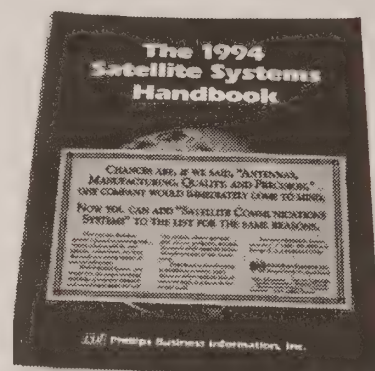
B.B. Building, 19/F, Suite 1906, 54 Asoke Road Sukhumvit 21 (Bangkok), 10110 THAILAND
(2)260 7306; fax: (2)260 7309
Year established: 1988; 68 employees
■Philip J. Richards, Managing Director; Srisuda Phetnaih, Manager of Finance; David M. Haworth, Marketing Manager; Worcester R. Angell, Manager of Engineering
■Provides one- and two-way data transmission at speeds from 9.6 KBPs to 128 KBPs. Accesses Asiasat S3 and S12.

More than 95 satellite system profiles... 120-plus operational satellites... 500 EIRP contours and satellite technical profiles...

Your single reference for technical and operating details on all commercial satellite systems and operators.

THE 1994 SATELLITE SYSTEMS HANDBOOK is your definitive guide to current and planned systems. Whether you need to uplink or downlink from anywhere in the world, design equipment for use with various satellite systems or if you coordinate satellite networks... THE 1994 SATELLITE SYSTEMS HANDBOOK will supply you with information to answer questions, solve problems and make key business decisions.

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The one, in-depth compendium of the industry. It's all here:

- ✓ EIRP and G/T contours
- ✓ Booking contacts and PTT decision makers
- ✓ Listings of transponder brokers and resellers
- ✓ Satellite systems index
- ✓ Table of geostationary orbital positions
- ✓ Satellite operators index
- ✓ Geographic index
- ✓ Satellite services index
- ✓ Transponder frequency plans
- ✓ Satellite operating characteristics
- ✓ Full coverage of geostationary and non-geostationary systems
- ✓ Operational and planned systems described
- ✓ Regulatory and telecommunications data, plus visible arc data for more than 500 countries, territories and islands

Who needs THE 1994 SATELLITE SYSTEMS HANDBOOK?

- ❖ Broadcasters
- ❖ Cable TV Professionals
- ❖ Business TV / Videoconferencing Professionals
- ❖ Educational TV / Distance Learning Professionals
- ❖ VSAT Corporate End Users
- ❖ Satellite Operators and Transmission Service Suppliers
- ❖ Consultants and Engineers
- ❖ Operations Managers
- ❖ PTTs
- ❖ Programming Networks and Syndicators
- ❖ Special Event Transmission Suppliers
- ❖ Government End Users
- ❖ Technical Librarians
- ❖ Educators
- ❖ Anyone involved in the transmission or reception of satellite signals



9 hardworking sections put all the satellite system facts, figures and receive/transmit patterns at your fingertips.

How to Use the Handbook

Satellite System Index

Table of Geostationary Orbital Positions

Satellite Operators Index

Section I: Operational Geostationary Systems

Section II: Planned Geostationary Systems

Section III: Operational Non-Geostationary Systems

Section IV: Planned Non-Geostationary Systems

Section V: International and Regional Networks

Section VI: Transponder Brokers and Resellers

Section VII: International, Intergovernmental and Regional Telecommunications Policy and Regulatory Organizations

Section VIII: National Data, Regulation and Policy

Section IX: Reference Data

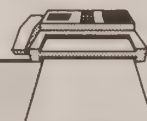
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HOW TO ORDER



Call for current selling price.

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SECTION 7

TELECOMMUNICATIONS POLICY ORGANIZATIONS

Included in This Section:

This section contains international policy regulatory organizations. A typical listing includes:

1. Organization name;
2. Address;
3. Telephone and fax numbers.

How to Use This Section:

Listings are arranged alphabetically by company name.

TELECOMMUNICATIONS POLICY ORGANIZATIONS

ARAB SATELLITE COMMUNICATIONS ORGANIZATION

P.O. Box 1038
Riyadh, SAUDI ARABIA
1 464-6666; fax: 1 465-6983

ARAB STATES BROADCASTING UNION (ASBU)

P.O. Box 65
62 Nahy Ibn Albassan
Almanzah 4, Tunis, TUNISIA

ARAB TELECOMMUNICATIONS UNION (ATU)

P.O. Box 5377
Baghdad, IRAQ

ASIAN INSTITUTE FOR BROADCAST DEVELOPMENT

Kuala Lumpur, Malaysia

ASIA-PACIFIC BROADCASTING UNION (ABU)

P.O. Box 1164
Jalan Pantai bhara
Kuala Lumpur 22-07, Malaysia

ASIA-PACIFIC BROADCASTING UNION (ABU)

NHK Broadcasting Center
2-1-1 Jinnan, Shibuya-ku
Tokyo 150, Japan

ASIA PACIFIC TELECOMMUNITY

Economic and Social Council for Asia and the Pacific
Sala Santitham
Rajadamnern Avenue
Bangkok 2, Thailand

COMMONWEALTH BROADCASTING ASSOCIATION

Broadcasting House
London W1A 1AA, UNITED KINGDOM

EUROPEAN BROADCAST UNION (EBU)

17a Ancienne Route
Casse Postale 67
CH-1218 Grand-Saconnex Geneva, SWITZERLAND
22 717-2111; fax: 22 798-5897

EUROPEAN SPACE AGENCY (ESA)

8-10 rue Mario Nikis
F-75015 Paris 15, FRANCE
1 42 73 76 54; fax: 1 42 73 75 60

INTERGOVERNMENTAL BUREAU FOR INFORMATICS (IBI)

Biale Civiltà del Lavoro 23
I-00144 Rome, ITALY

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)

P.O. Box 400
International Aviation Square
1000 Sherbrooke Street
West Montreal, PQ H3A 2R2, CANADA

INTERNATIONAL INSTITUTE OF COMMUNICATIONS

Tavistock House South
Tavistock Square
London WC1H 9LF, UNITED KINGDOM
1 388-0671; fax: 1 380-0623

INTERNATIONAL MARITIME ORGANIZATION (IMO)

4 Albert Embankment
London SE1 7SR, UNITED KINGDOM
71-735-7611; fax: 71-758-3210

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (OSI)

1 rue de Varembe
Casse Postale 56
Geneva CH-1211, SWITZERLAND
22 749-0111; fax: 22 733-3420

INTERNATIONAL PROGRAM FOR THE DEVELOPMENT OF COMMUNICATION (IPDC)

7 Place de Fontenoy
F-75700 Paris, FRANCE

INTERNATIONAL RADIO AND TELEVISION ORGANIZATION (OIRT)

U Mrázovky 15
CH-151 13 Prague 5, CZECH REPUBLIC

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

Place des Nations
Geneva CH-1211, SWITZERLAND
22 730-5111; fax: 22 733-7256

INTERNATIONAL TELECOMMUNICATIONS USERS GROUP

18 Westminster Palace Gardens
Artillery Row
London SW1P 1RR, UNITED KINGDOM
71 799-2446; fax: 71 799-2445

ISLAMIC STATES BROADCASTING SERVICES ORGANIZATION

Pakistan Broadcasting Corporation
Broadcasting House
Islamabad, Pakistan

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)

2 rue Andre-Pascal
Paris 16, FRANCE

SOCIETE INTERNATIONALE DES TELECOMMUNICATIONS AERONAUTIQUES

112 Avenue Charles de Gaulle
Neuilly-Sur-Seine F-92522, FRANCE
1 47 38 50 00; fax: 1 7 47 15 42

SOCIETY FOR WORLDWIDE INTERBANK FINANCIAL TELECOMMUNICATIONS S.C.

1 Avenue Adele
La Hulpe B-1310, BELGIUM
2 655-3111; fax: 2 655-3226

UN COMMISSION ON INTERNATIONAL TRADE LAW (UNCITRAL)

Vienna International Center
P.O. Box 500
A-1400 Vienna, AUSTRIA

UNION DES RADIODIFFUSIONS ET TELEVISIONS NATIONALES D'AFRIQUE (URTNA)

101 Rue Carnot
B.P. 3237
Dakar, Senegal

WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO)

24 Chemin des Colombettes
CH-1211 Geneva 20, SWITZERLAND

SECTION 8

NATIONAL DATA, REGULATION AND POLICY

Included in This Section:

This section contains extensive information on geographical, demographical and technical information on territories, islands and surrounding countries in the Asia-Pacific region.

How to Use This Section:

This section is arranged alphabetically by country, territory and island name. If an entry reads "NA," the information was not available at press time.

NATIONAL DATA, REGULATION AND POLICY

■ AMERICAN SAMOA

Status: Territory of the United States
Capital: Pago Pago
ITU abbreviation: SMA
ITU Region: 3

International telephone dialing code: 684
International telex dialing code: NA

Demographic and Physical Information

Area: 199 km²
Population: 42,000
Major languages: Samoan, English
Time zones: GMT - 11h

Telecommunications Statistics

Number of telephones: 6,500
Submarine cable connections: NA
Radio stations: 1
Television standard: NTSC M
Electrical standard: 120 vac, 60 Hz
State-run television networks: 0
Private television networks: 0
Television stations: 1
Television sets: NA
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Director of Communications
American Samoa Government
Telephone: 633-1121
Telex: 782 502
Telegraph: Dircomm Pago Pago

Range of Geostationary Satellites Visible

Location Pago Pago
Lat.° 14.3°S
Long.° 170.7°W
° Long. Differ. Visible 76°
Eastern Limit for GSO 113°E
Western Limit for GSO 265°E (95°W)

■ AUSTRALIA

Official name: Commonwealth of Australia
Capital: Canberra
ITU country abbreviation: AUS
ITU Region: 3

International telephone dialing code: 61
International telex dialing code: 790

Demographic and Physical Information

Area: 7.7 million km²
Population: 16.9 million
Major languages: English
Time zones: GMT + 8h, GMT + 9h30m, GMT + 10h

Telecommunications Statistics

Number of telephones: 8.7 million
Submarine cable connections: 3
Radio stations: 258 AM, 67 FM
Television standard: PAL B (terrestrial), B-MAC (BSS)
Electrical standard: 240 vac, 50 Hz
State-run television networks: 2
Private television networks: 3
Television stations: 134
Television sets: NA
TV households: 5 million
Cable penetration: none
VCR penetration: 68%
Satellite Earth stations: \$ IOR, 6 POR Intelsat; many domestic

Telecommunications Regulatory Organization

Department of Transport and Communications
The Secretary
G.P.O. 594
Canberra, ACT 2601 Australia
Telephone: +61 62 747111
Fax: +61 62 746524

Australian Telecommunications Authority (AUSTEL)
Telecommunications Regulatory Agency
P.O. Box 7372
St. Kilda Road
Melbourne, VIC 3004
Telephone: 61-3828 7400
Fax: 61-3820 3021

Officials

Graham Evans, Secretary, Department of Transport and Communications
Kim Beazley, Minister for Transport and Communications -

Broadcasting Services

Australian Broadcasting Corporation — ABC
GPO Box 487
Sydney NSW 2001 Australia
Telephone: (2) 33 90211
Fax: (2) 950 4585/3055
Telex: 071abc 9a26889
abc aa20123

Seven Network Australia
Television Center
Mobbs Lane
Epping NSW 2121 Australia
Telephone: (2) 877 7777 Programs: (2) 877 7272
Fax: (2) 877 7888 Programs: (2) 877 7892
Telex: 145395 - AA 20250

Nine Network Australia
24 Artarmon Road
P.O. Box 27
Willoughby NSW 2068 Australia
Telephone: (2) 906 9999
Fax: (2) 958 2279 or 965 2154
Telex: AA74420

Network Ten Australia
Broadcom House
44 Bay Street
Ultimo NSW 2007 Australia
Telephone: (2) 844 1010
Fax: (2) 844 1364

Special Broadcasting Service — SBS
4 Cliff Street
Milsons Point NSW 2061 Australia
Telephone: (2) 964 2828
Fax: (2) 957 3571
Telex: 120944

Other Recognized Operators

Aussat Pty. Ltd.
GPO Box 1512
Sydney NSW 2001 Australia
Telephone: +61 2 2387800
Fax: +61 2 2387839
Telex: aussat aa26921

The Managing Director
OTC Limited
GPO Box 7000
Sydney NSW 2001 Australia
Telephone: +61 2 2875000
Fax: +61 2 2875103
+61 2 2875287
Telex: OTC aa120591

The Managing Director
Telecom Australia
Communications House
199 William Street
Melbourne, VIC. 3001 Australia
Telephone: +61 3 6065511
Fax: +61 3 6703388
+61 3 6421815
Telex: telecom aa152152

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: OTC Limited Sydney
Ownership: 2.856452%
Telephone: (2) 287 5555
Telex: 71 10165
Earth station and satellites:
Ceduna 1 (IOR major path) - 63.0
Ceduna 2 (IOR primary) - 60.0
Melbourne 1 (POR spare) - 180.0
Perth 1 (IOR primary) - 60.0
Perth 1 (IOR major path) - 63.0
Perth 2 (POR primary) - 174.0
Sydney 1 (POR spare) - 180.0
Sydney 2 (POR primary) - 174.0
Sydney 4 (POR primary) - 177.0

International Maritime Satellite Organization (Inmarsat)
Signatory: OTC Limited
Ownership: NA
Earth station: Perth (IOR and POR)

Domestic Satellite Networks

Operator: Optus Communications Pty. Ltd.
Telephone: +61 2 238-7800
Fax: +61 2 238-7100
Telex: 26921 aussat

Satellites:
Optus A1 160°E
Optus A2 156°E
Optus A3 164°E
Optus B1 NA

Range of Geostationary Satellites Visible

Location Brisbane
Lat.° 27.5N
Long.° 78E
°Long. Differ. Visible 75°
Eastern Limit for GSO 78°E
Western Limit for GSO 228°E

Location Canberra
Lat.° 35.3N
Long.° 149.1E
°Long. Differ. Visible 73°
Eastern Limit for GSO 76°E
Western Limit for GSO 222°E

Location Perth
Lat.° 31.9S
Long.° 115.9°E
°Long. Differ. Visible 74°
Eastern Limit for GSO 42°E
Western Limit for GSO 190°E

Location Sydney
Lat.° 33.9S
Long.° 151.2E
°Long. Differ. Visible 74°
Eastern Limit for GSO 77°E
Western Limit for GSO 225°E

■ BANGLADESH

Official name: People's Republic of Bangladesh
Capital: Dhaka
ITU country abbreviation: BGD
ITU Region: 1

International telephone dialing code: 880
International telex dialing code: 950

Demographic and Physical Information

Area: 144,000 km²
Population: 118.4 million
Major languages: Bangla (official); English
Time zones: GMT + 6h

Telecommunications Statistics

Number of telephones: 182,000
Submarine cable connections: none
Radio stations: 9 AM, 6 FM
Television standard: PAL B
Electrical standard: 220 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 11
Television sets: NA
TV households: 400,000
Cable penetration: none
VCR penetration: 5%
Satellite Earth stations: 2 Intelsat IOR

Telecommunication Regulatory Organization

Bangladesh Telegraph and Telephone Board
Telejogajog Bhaban
36/1, Mymensing Road
DHAKA-1000, Bangladesh
Telephone: +880 2 831500
+880 2 407800
Telex: 0780 642020
b#b bj/642030
Fax: 880 2 832 577
880 2 833 003

Officials

Janab F.Q.M. Farooq, Director (International)
Mohammad Shamsul Islam, State Minister for Post and Telecommunications
Fazlur Rahman, Chairman, Bangladesh Telegraph and Telephone

Broadcasting Services

Bangladesh Television — BTV
National Broadcasting Authority (TV Wing)
N.B.A. Bhaban
121 Kazi Nazrul Islam Avenue
Dhaka, Bangladesh
Telephone: (2) 880 2 503342
Fax: (2) 83 29 27
Telex: 0780 65624 btubj

Official

Janab Saiful Bari, Chairman, National Broadcasting Authority

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Telegraph and Telephone Board of Bangladesh
Teleboard Dacca
Ownership: 0.215680%
Telephone: (2) 83 42 72
Telex: (2) 780 642027
Earth station and satellite:
Betbungia — IOR Primary - 60.0
Talibabad — IOR Primary - 60.0

Range of Geostationary Satellites Visible

Location Dhaka
Lat.° 24.4N
Long.° 90.4E
°Long. Differ. Visible 75°
Eastern Limit for GSO 165°E
Western Limit for GSO 15°E

■ BRUNEI

Official name: Negara Brunei Darussalam
Capital: Bandar Seri Begawan
ITU country abbreviation: BRU
ITU Region: 3

International telephone dialing code: 673
International telex dialing code: 673

Demographic and Physical Information

Area: 5,770 km²
Population: 269,319
Major languages: Malay (official), English, Chinese
Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 33,000
Submarine cable connections: NA
Radio stations: 4 AM/FM
Television standard: PAL B
Electrical standard: 240 vac, 50 Hz

State-run television networks: 1
Private television networks: none
Television stations: 1
Television sets: NA
TV households: 67,000
Cable penetration: none
VCR penetration: 60%
Satellite Earth stations: 1 Intelsat IOR, 1 Intelsat POR

Telecommunications Regulatory Organization

Telecommunications Department
Director of Telecommunications
Bandar Seri Begawan, Brunei
Telephone: 2 242324
Fax: 2 220445

Officials

Dato Haji Abdullah bin Mudim Haji, Director of Telecommunications

Broadcasting Services

Radio Television Brunei — RTB
Bandar Seri Begawan 2042
Darussalam, Brunei
Telephone: (2) 43 111
Fax: (2) 41 882
Telex: 2311 or 2720

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

Range of Geostationary Satellites Visible

Location	Bandar
Lat.°	4.9N
Long.°	115E
° Long. Differ. Visible	76°
Eastern Limit for GSO	191°E
Western Limit for GSO	39°E

■ CAMBODIA

Official name: Cambodia
Capital: Phnom Penh
ITU country abbreviation: CBG
ITU Region: 3

International telephone dialing code: NA
International telex dialing code: NA

Demographic and Physical Information

Area: 181,040 km²
Population: 7.30 million
Major languages: Khmer (official); French
Time zones: GMT + 7h

Telecommunications Statistics

Number of telephones: NA

Submarine cable connections: none
Radio stations: 1 A, 1 FM
Television standard: none
Electrical standard: 120 and 220 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 1
Television sets: NA
TV households: 55,000
Cable penetration: none
VCR penetration: NA
Satellite Earth stations: NA

Telecommunications Regulatory Organization

NA; see representative in Thailand, below

Officials

M. le Vice-President du Cambodge
chargé des affaires d'étrangères
c/o Mission Permanente de Cambodge
auprès de l'ESCAP
486 Thetsabarn Nimit Nua Road
Lard Yao, Bangkok
Bangkok 9, Thailand

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

Range of Geostationary Satellites Visible

Location	Phnom Penh
Lat.°	11.5N
Long.°	104.9E
° Long. Differ. Visible	76°
Eastern Limit for GSO	181°E
Western Limit for GSO	29°E

■ CHINA, PEOPLE'S REPUBLIC OF

Official name: People's Republic of China
Capital: Beijing
ITU country abbreviation: CHN
ITU Region: 3

International telephone dialing code: 86
International telex dialing code: 716

Demographic and Physical Information

Area: 9.6 million km²
Population: 1,170 million
Major languages: Chinese, Mandarin, other regional dialects
Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 11.0 million
Submarine cable connections: none

Radio stations: 274 AM
Television standard: PAL D
Electrical standard: 220 vac, 50 Hz
State-run television networks: NA
Private television networks: NA
Television stations: 202 (2,050 repeaters)
Television sets: 75 million
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations: 3 Intelsat POR
3 Intelsat IOR
1 INMARSAT POR/IOR
>55 domestic

Telecommunications Regulatory Organization

Ministry of Posts and Telecommunications
Directorate General of Telecommunications
13 West Chang An Avenue
Beijing 100804 China
Telephone: +86 1 601 1250
Fax: +86 1 601 1250
Telex: 085 222185 dgtelcn

Officials

Luan Zhengxi, Director-General of Telecommunications

Director, Department of External Affairs
Ministry of Posts and Telecommunications
13 West Changan Avenue
Beijing 100804 China
Telephone: +86 1 601 4670
Fax: +86 1 601 1370
Telex: 085 222187 ptdecn

Official

Zhao Xintong, Director, Department of External Affairs, Ministry of Posts and Telecommunications

Broadcasting Services

China Central Television — CCTV
No. 11 Fuxing Road
Beijing 100859 China
Telephone: (1) 801 1144
Fax: (1) 801 2010
Telex: 222300

Guandong Television
686 Ren Min Bei Radd
Guangzhou, China
Telephone: (20) 66 53 76
Fax: (20) 67 70 13
Telex: 44237

Beijing Television Station
No. 14 Xin Jie Kou Wai Da Jie
Beijing, China

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
 Signatory: Ministry of Posts and Telecommunications
 Pktelcom
 Ownership: 1.590957%
 Telephone: (1) 602 4044
 Fax: (1) 602 4044
 Telex: 22230

Earth station and satellites:

Beijing 1 — POR Primary - 174.0
 Beijing 2 — IOR Major Path - 63.0
 Beijing 3 — IOR Primary - 60.0
 Shanghai — POR Primary - 174.0
 Taipei 2 — POR Primary - 174.0
 Taipei 3 — IOR Primary - 60.0

International Maritime Satellite Organization

(Inmarsat)
 Signatory: Ministry of Posts and Telecommunications
 Ownership: NA
 Earth station:
 Beijing (IOR/POR)

Domestic Satellite Network

Dongfanghong (DFH, ChinaSat)

Operator: Ministry of Posts and Telecommunications

Telephone: +86 1 601-1250
 Fax: +86 1 601-1250
 Telex: 222185

Satellites:

STW-1 125°E
 STW-2 103°E
 DFH2-A1 (Chinasat) 87.5°E
 DFH2-A2 (Chinasat) 110.5°E
 DFH2-A3 (Chinasat) 98°E

Range of Geostationary Satellites Visible

Location Beijing
 Lat.° 39.9N
 Long.° 116.3E
 °Long. Differ. Visible 72°
 Eastern Limit for GSO 188°E
 Western Limit for GSO 44°E

Location Chengdu
 Lat.° 30.6N
 Long.° 104E
 °Long. Differ. Visible 74°
 Eastern Limit for GSO 178°E
 Western Limit for GSO 30°E

Location Guangzhou
 Lat.° 23.1N
 Long.° 113.2
 °Long. Differ. Visible 75°
 Eastern Limit for GSO 188°E
 Western Limit for GSO 38°E

Location Kunming
 Lat.° 25N
 Long.° 102.7E
 °Long. Differ. Visible 75°
 Eastern Limit for GSO 178°E
 Western Limit for GSO 28°E

Location Shanghai
 Lat.° 31.2N
 Long.° 121.4E
 °Long. Differ. Visible 74°
 Eastern Limit for GSO 195°E
 Western Limit for GSO 47°E

Location Tianjin
 Lat.° 39.1N
 Long.° 117.2W
 °Long. Differ. Visible 72°
 Eastern Limit for GSO 189°E
 Western Limit for GSO 45°E

■ CHINA, REPUBLIC OF

see Taiwan

■ CHRISTMAS ISLAND (AUSTRALIA)

Status: territory of Australia
 ITU Region: 3

International telephone dialing code: none
 International telex dialing code: none

Demographic and Physical Information

Area: 135 km²
 Population: 929
 Major languages: English
 Time zones: GMT + 6h30m

Telecommunications Statistics

Number of telephones: none
 Submarine cable connections: none
 Radio stations: NA
 Television standard: none
 Electrical standard: NA
 State-run television networks: none
 Private television networks: none
 Television stations: none
 Television sets: none
 TV households: none

Cable penetration: none
 VCR penetration: none
 Satellite Earth stations: none

Range of Geostationary Satellites Visible

Location Chr. Islands
 Lat.° 10.5S
 Long.° 105.7E
 °Long. Differ. Visible 76°
 Eastern Limit for GSO 182°E
 Western Limit for GSO 30°E

■ COCOS (KEELING) ISLANDS (AUSTRALIA)

Status: territory of Australia
 ITU Region: 3

International telephone dialing code: 61 (via Australia)
 International telex dialing code: 790 (via Australia)

Demographic and Physical Information

Area: 14 km²
 Population: 597
 Major languages: English
 Time zones: GMT + 6h30m

Telecommunications Statistics

Number of telephones: NA
 Submarine cable connections: none
 Radio stations: 1 AM
 Television standard: none
 Electrical standard: 240 vac, 50 Hz
 State-run television networks: none
 Private television networks: none
 Television stations: none
 Television sets: none
 TV households: none
 Cable penetration: none
 VCR penetration: none
 Satellite Earth stations: 1

Range of Geostationary Satellites Visible

Location West Island
 Lat.° 12.2S
 Long.° 96.9E
 °Long. Differ. Visible 76°
 Eastern Limit for GSO 173°E
 Western Limit for GSO 21°E

■ COOK ISLANDS

Status: self-governing free association with New Zealand; fully responsible for internal affairs; New Zealand in consultation with Cook Islands responsible for external affairs
ITU abbreviation: CKH
ITU Region: 3

International telephone dialing code: NA
International telex dialing code: NA

Demographic and Physical Information

Area: 240 km²
Population: 17,977
Major languages: English (official); Maori
Time zones: GMT - 11h

Telecommunications Statistics

Number of telephones: 2,052
Submarine cable connections: none
Radio stations: 2 AM
Television standard: none
Electrical standard: NA
State-run television networks: none
Private television networks: none
Television stations: none
Television sets: none
TV households: none
Cable penetration: none
VCR penetration: none
Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Director General
Chief Post Office
Raratonga, Cook Islands
Telephone: +682 29470
Fax: +682 20990
Telex: 0772 62010 /comdiv rg

Officials

Mr. Stewart Davies, Director General

Other Recognized Operators

Telecom Cook Islands Ltd.
P.O. Box 106
Rarotonga, Cook Islands
Telephone: +682 29680
Fax: +682 20990
Telex: 0772 62010 rg

Officials

P.J. Richards, Manager, Cable and Wireless Plc.

Range of Geostationary Satellites Visible

Location Cook Islands
Lat.° 17S
Long.° 160W
°Long. Differ. Visible 76°
Eastern Limit for GSO 236°E (124°W)
Western Limit for GSO 84°E

■ FIJI

Official name: Republic of Fiji
Capital: Suva
ITU country abbreviation: FJI
ITU Region: 3

International telephone dialing code: 679
International telex dialing code: NA

Demographic and Physical Information

Area: 18,270 km²
Population: 749,946
Major languages: English (official); Fijian, Hindustani
Time zones: GMT + 12h

Telecommunications Statistics

Number of telephones: 53,228
Submarine cable connections: 1
Radio stations: 7 AM, 1 FM
Television standard: none
Electrical standard: 240 vac, 50 Hz
State-run television networks: none
Private television networks: none
Television stations: none
Television sets: none
TV households: none
Cable penetration: none
VCR penetration: none
Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Fiji Posts and Telecommunications
P. O. Box 40
Government Buildings
Suva, Fiji
Telephone: +679 21019
Fax: +679 21 30 17 65

Officials

Vincent Lobendahn, Minister for State Television and Telecommunications
E. Nagova, Managing Director, Fiji Posts and Telecommunications Ltd.
Taufa Vakatale, Permanent Secretary

Broadcasting Services

Fiji Broadcasting Commission
Broadcasting House
P. O. Box 334
69 Gladstone Road
Suva, Fiji
Telephone: +679 31 43 33
Telex: 071 2142 fbc sv fj

Officials

Hugh Leonard, General Manager, Fiji Broadcasting Commission

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Fiji International Telecommunications Ltd.
Ownership: 0.050000%
Earth stations:
Intelsat (POR)

Range of Geostationary Satellites Visible

Location Suva
Lat.° 18.1S
Long.° 178.5E
°Long. Differ. Visible 76°
Eastern Limit for GSO 254°E
Western Limit for GSO 103°E

■ FRENCH POLYNESIA (FRANCE)

Status: overseas territory of France
Capital: Papeete, Tahiti
ITU abbreviation: OCE
ITU Region: 3

International telephone dialing code: 689
International telex dialing code: NA

Demographic and Physical Information

Area: 3,941 km²
Population: 205,620
Major languages: Tahitian (official); French
Time zones: GMT - 10h

Telecommunications Statistics

Number of telephones: 33,200
Submarine cable connections: none
Radio stations: 5 AM, 2 FM
Television standard: SECAM
Electrical standard: 127 vac, 60 Hz
State-run television networks: 1
Private television networks: none
Television stations: 6
Television sets: 30,000
TV households: 30,000
Cable penetration: none
VCR penetration: NA
Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Direction de l'Office des Postes et
Télécommunications
Papeete, French Polynesia
Telephone: +689 41 42 42
Telex: postelec 530 fp
Fax: +689 43 67 67

France Cables et Radio (FCR)
Télécommunications Extérieures de la Polynésie
Française
B.P. No. 99
Papeete, French Polynesia
Telephone: +689 41 54 00
Telex: (0702) 508
Fax: +689 43 75 53

Broadcasting Services

Société Nationale de Radio Television Française
d'Outre Mer
B. P. 125
Papeete, French Polynesia
Telephone: +689 20551
Telex: 070200

Earth station:
Papenuo 2 (POR primary) 174

Range of Geostationary Satellites Visible

Location	Papeete
Lat.°	17.6S
Long.°	149.4E
°Long. Differ. Visible	76°
Eastern Limit for GSO	225°E
Western Limit for GSO	73°E

■ GUAM

Status: territory of the United States
Capital: Agana
ITU abbreviation: GUM
ITU Region: 3

International telephone dialing code: 671
International telex dialing code: 721

Demographic and Physical Information

Area: 541 km²
Population: 142,271
Major languages: English, Chamorro, Japanese
Time zones: GMT + 10h

Telecommunications Statistics

Number of telephones: 26,317
Submarine cable connections: none
Radio stations: 3 AM, 3 FM
Television standard: NTSC
Electrical standard: 110, 120 vac, 60 Hz
State-run television networks: none
Private television networks: 1
Television stations: 3

Television sets: 80,000
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations:
Finegayan (POR primary)
Pulantat (POR primary)

Telecommunications Regulatory Organization

Guam Telephone Authority
P. O. Box 9008
Tamuning, Guam 96911
Telephone: +671 646-6971
Telex: 013235 / 7216323

Broadcasting Services

Guam Television
P. O. Box 368
Agana, Guam 96910
Telephone: +671 477-9861

Earth Stations:
Finegayan (POR primary) 174
Pulantat 2 (POR primary) 174

Range of Geostationary Satellites Visible

Location	Guam
Lat.°	13.4N
Long.°	144.7E
°Long. Differ. Visible	76°
Eastern Limit for GSO	221°E
Western Limit for GSO	69°E

■ HONG KONG (UNITED KINGDOM)

Status: dependent territory of the United Kingdom
(until 1 July, 1997)
ITU abbreviation: HKG
ITU Region: 3

International telephone dialing code: 852
International telex dialing code: 780

Demographic and Physical Information

Area: 1,040 km²
Population: 5.9 million
Major languages: Cantonese, English
Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 3 million
Submarine cable connections: 5
Radio stations: 6 AM, 6 FM
Television standard: UHF: PAL I
Electrical standard: 200 vac, 50 Hz
State-run television networks: none
Private television networks: 4

Television stations: 4
Television sets: 2 million
TV households: 1.3 million
Cable penetration: none
VCR penetration: 60%
Satellite Earth stations: 2 Intelsat POR, 2 Intelsat IOR

Telecommunications Regulatory Organization

The Postmaster General
General Post Office
Hong Kong
Telephone: +852 847-1111
Telex: 65958 gpohk hx
Fax: +852 868-0094

Broadcasting Services

Asia Television Ltd. (ATV)
81 Broadcast Drive
P. O. Box 1414
Kowloon, Hong Kong
Telephone: +852 339-9111
Telex: 44680
Fax: +852 338-0438

Television Broadcasts Ltd.
TV City
Clear Water Bay Road
Kowloon, Hong Kong
Telephone: +852 719-4828
Telex: 53059
Fax: +852 358-1325

Satellite Television Asian Region Ltd. (STAR TV)
Unit 107, Harbour Centre Tower 1
1 Hok Cheung Street
Hungnam, Hong Kong
Telephone: +852 356-4108
Fax: +852 356-1442

Hong Kong Cable Communications Ltd.
19/F Guardian House
32 Oi Kwan Road
Wanchai, Hong Kong
Telephone: +852 831-1311
Fax: +852 834-8340 / 838-7555

Other Recognized Operators

Hong Kong Telecom International Ltd. (HKTI)
Cable and Wireless Hong Kong
GPO Box 597
Telecom House
3 Gloucester Road
Wanchai, Hong Kong
Telephone: +852 829-1111
Telex: 73240 cwadm hx
Fax: +852 824-3329

Hong Kong Telephone Company Ltd.
PO Box 9896
26/F, Office Tower, Convention Plaza
1 Harbour Road, Wanchai
Hong Kong
Telephone: +852 888 2888
Telex: 0802 73240 hkct hxx
Fax: +852 877-8877

Hutchison Telecommunications Ltd.
c/o Hutchison AT&T Network Services Ltd.
88 Gloucester Road
4/F China Underwriters Centre, Wanchai
Hong Kong

Officials

John Kyriaco, Hutchison Telecommunications Ltd.

Earth stations:

Hong Kong 1 (POR spare) 180
Hong Kong 2 (IOR major path) 63
Hong Kong 3 (IOR primary) 60
Hong Kong 4 (POR primary) 174

Range of Geostationary Satellites Visible

Location Hong Kong
Lat.° 22.2N
Long.° 114.2W
°Long. Differ. Visible 75°
Eastern Limit for GSO 190°E
Western Limit for GSO 39°E

■ INDIA

Official name: Republic of India
Capital: New Delhi
ITU country abbreviation: IND
ITU Region: 3

International telephone dialing code: 91
International telex dialing code: 953

Demographic and Physical Information

Area: 3.29 million km²
Population: 886.4 million
Major languages: Hindi, English, 14 other official languages
Time zones: GMT + 5h30m

Telecommunications Statistics

Number of telephones: 4.7 million
Submarine cable connections: 3
Radio stations: 96 AM, 4 FM
Television standard: PAL B
Electrical standard: 230 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 274
Television sets: 50 million
TV households: 20 million
Cable penetration: 4%
VCR penetration: 25%
Satellite Earth stations: 2 Intelsat IOR

Telecommunications Regulatory Organization

Ministry of Communications
Sardar Patel Bhavan
Parliament Street
New Delhi 110001, India
Telephone: +91 11 35 06 07
Telex: 3161160 comn in
Fax: +91 11 374-6111

Officials

Sukh Rann, Minister of State for Communications
H.P. Wagle, Chairman, Telecommunications Commission and Secretary, Department of Telecommunications.

Broadcasting Services

All India Radio
Akashvani Bhavan
Parliament Street
New Delhi 110001, India
Telephone: +91 11 371-0058
Telex: 31 65585 dair in
Fax: +91 11 371-4061

Doordarshan India (TVI)
Doordarshan Bhawan
Copernicus Marg
Mandi House
New Delhi 110001, India
Telephone: +91 11 38 20 94
Telex: 31 66413
Fax: +91 11 38 65 07

India Vision
1501 B Kanti Apt.
Mount Mary Road, Bandra
Bombay, India
Telephone: +91 22 644-1212
Telex: 73484 seso in
Fax: +91 22 642-1299

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Videsh Sanchar Nigam Limited
Ownership: 1.877491%
Earth stations:
Ahkmed (IOR major path) 63
Vikram (IOR primary) 60

International Maritime Satellite Organization (Inmarsat)
Signatory: Videsh Sanchar Nigam Limited
Ownership: NA
Earth station:
Aarvi (IOR)

Domestic Satellite Network

Operator: Indian Department of Space
Telephone: +91 812 33 44 74
Telex: 0845-2499 / 0845-2326

Satellites:

Insat 1C 74°E
Insat 1D 82.9°E

Range of Geostationary Satellites Visible

Location Bangalore
Lat.° 13.0N
Long.° 77.7E
°Long. Differ. Visible 76°
Eastern Limit for GSO 154°E
Western Limit for GSO 2°E

Location Bombay
Lat.° 18.9N
Long.° 72.2E
°Long. Differ. Visible 76°
Eastern Limit for GSO 149°E
Western Limit for GSO 257°E (3°W)

Location Calcutta
Lat.° 22.6N
Long.° 88.4E
°Long. Differ. Visible 75°
Eastern Limit for GSO 163°E
Western Limit for GSO 13°E

Location New Delhi
Lat.° 28.6N
Long.° 77.2W
°Long. Differ. Visible 75°
Eastern Limit for GSO 152°E
Western Limit for GSO 2°E

■ INDONESIA

Official name: Republic of Indonesia
Capital: Jakarta
ITU country abbreviation: INS
ITU Region: 3

International telephone dialing code: 62
International telex dialing code: 796

Demographic and Physical Information

Area: 1.92 million km²
Population: 195.68 million
Major languages: Bahasa Indonesian (official); English, Dutch, Javanese
Time zones: GMT + 7h

Telecommunications Statistics

Number of telephones: 763,000
Submarine cable connections: NA
Radio stations: 618 AM, 38 FM
Television standard: PAL B
Electrical standard: 127 and 220 vac, 50 Hz
State-run television networks: 1

Private television networks: 2
 Television stations: 9
 Television sets: 20 million
 TV households: 20 million
 Cable penetration: none
 VCR penetration: 13%
 Satellite Earth stations: 1 Intelsat IOR, 1 Intelsat POR

Telecommunications Regulatory Organization

Directorate General of Posts and Telecommunications (POSTEL)
 Jalan Kebon Sirih 37
 Jakarta 10340, Indonesia
 Telephone: +62 21 34 60 00/6221 347000
 Telex: 44407 postel ia
 Fax: +62 21 310-2254

Officials

Djakana Puraawidjaya, Director General, POSTEL
 Sri Slameto, Deputy Director General
 Mr. Soegiharto, Deputy Director General for Telecommunications

Broadcasting Services

Radio Republik Indonesia
 Jalan Medan Merdeka Barat
 Barat No. 4-5
 Jakarta 10160, Indonesia
 Telephone: +62 21 37 75 08
 Telex: 46154 tvri ia

Televisi Republik Indonesia (TVRI)
 Jalan Gerbang Pemuda
 Senayan
 Jakarta, Indonesia
 Telephone: +62 21 58 2160
 Telex: 073 46154 turijkt
 Fax: +62 21 58 31 22

Other Recognized Operators

Directorate General of Sea Communications
 Jalan Medan Merdeka
 Timur No. 5
 Jakarta 10110, Indonesia
 Telephone: +62 21 34 87 98
 Telex: 46117 djpl jkt
 Fax: +62 21 34 44 92

PT Indonesia Satellite Corporation (PT INDOSAT)
 Jalan Medan Merdeka Barat No. 21
 P.O. Box 2905
 Jakarta 10110, Indonesia
 Telephone: +62 21 380-2614
 Telex: 44383 indsat ia
 Fax: +62 21 37 04 84

Perum Telekomunikasi (PERUMTEL)
 Headquarters
 Jalan Cisanggarung 2
 Bandung 40115, Indonesia
 Telephone: +62 22 43 61 00
 Telex: 28220 diruttel ia
 Fax: +62 22 44 03 13

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
 Signatory: PT Indosat
 Ownership: 0.575707%
 Earth stations:
 Jatiluhur 1 (POR primary) 174
 Jatiluhur 2 (IOR primary) 60

International Maritime Satellite Organization (Inmarsat)
 Signatory: NA
 Ownership: NA
 Earth station: none

Domestic Satellite Network

Operator: PT Telekomunikasi Indonesia
 Telephone: +62 21 520-3321
 Fax: +62 21 520-3322
 Telex: +62 21 60751

Satellites:
 Palapa B1 118°E
 Palapa B2P 113°E
 Palapa B2R 108°E
 Palapa B4 NA

Range of Geostationary Satellites Visible

Location Jakarta
 Lat.° 6.1S
 Long.° 106.8E
 ° Long. Differ. Visible 76°
 Eastern Limit for GSO 183°E
 Western Limit for GSO 31°E

■ JAPAN

Official name: Japan
 Capital: Tokyo
 ITU country abbreviation: J
 ITU Region: 3

International telephone dialing code: N/A
 International telex dialing code: 781

Demographic and Physical Information

Area: 377,835 km²
 Population: 124.46 million
 Major languages: Japanese
 Time zones: GMT + 10h

Telecommunications Statistics

Number of telephones: 64 million
 Submarine cable connections: several
 Radio stations: 318 AM, 58 FM
 Television standard: NTSC M
 Electrical standard: 100 vac, 50 and 60 Hz
 State-run television networks: 1

Private television networks: 5
 Television stations: 12,350
 Television sets: 75 million
 TV households: 38 million
 Cable penetration: 19%
 VCR penetration: 72%
 Satellite Earth stations: 2 Intelsat IOR, 2 Intelsat POR,
 1 Inmarsat IOR, 1 Inmarsat POR

Telecommunications Regulatory Organization

Ministry of Posts and Telecommunications
 3-2, Kasumigaseki 1-chome, Chiyoda-EJ,
 Tokyo 100 100-90, Japan
 Telephone: +81 3 35 04 792
 Fax: +81 3 3509 5077

Officials

Junichiro Koizuma, Ministry of Posts and Communications; Tetsuo Morimoto, Vice-Minister of Posts and Communications

Broadcasting Services

Nippon Hoso Kyokai - NHK
 Hoso Center, 2-2-1 Jinnan, Shibuya-Ku,
 Tokyo 150, Japan
 Telephone: +81 3 34 65 11 11 or 34 65 81 10;
 Fax: +81 3 33 74 59 48
 Telex: 22377

Nippon Minkan Hoso Renmei
 (National Association of Commercial Broadcasters in Japan)
 No 3, Kiocho, Chiyoda-Ku
 Tokyo 100 Japan
 Telephone: 81 3 32657 481

Asahi National Broadcasting Company - TV Asahi (ANB)
 1-1-1 Roppongi, Minato-Ku, Tokyo 106, Japan
 Telephone: +81 3 35 87 54 12 or 35 87 51 11
 Fax: +81 3 35 03 35 39
 Telex: 22520

Fuji Telecasting Network Inc. - FTN
 3-1 Kadawa-Cho, Shijuku-Ku, Tokyo 162, Japan
 Telephone: +81 3 33 53 111
 Fax: +81 3 36 88 03 92
 Telex: 25948

Nippon Television Network Corporation - NTV
 14 Niban-Cho, Chiyoda-Ku, Tokyo 102, Japan
 Telephone: +81 3 35275 1111
 Fax: +81 3 32 63 60 08
 Telex: 24566

Tokyo Broadcasting System Inc. - TBS
 5-3-6 Akaska, Minato-Ku, Tokyo 107-06, Japan
 Telephone: +81 3 35 84 31 11
 Fax: +81 3 35 88 63 78
 Telex: J23536 TBSINC

Mainichi Broadcasting System Inc. - MBS
17-1 Chayamachi, Kita-Ku, Osaka 530-04, Japan
Telephone: +81 06 359-1123
Telex: J63445
Fax: +81 06 359-3503

TV Tokyo 12
4-3-12 Toranomom, Minayp-Ku, Tokyo 105, Japan
Telephone: +81 3 34 32 12 12
Telex: 28475
Fax: +81 3 35 78 01 83 or 32 30 41 60

Japan Satellite Broadcasting - JSB
1-22-15 Toranomom, Minato-kyu, Tokyo 105, Japan
Telephone: +81 3 35 96 83 10
Fax: +81 3 35 01 53 17

Other Recognized Operators

DDI Corporation
Ichibancho FS Building
8, Ichiban-cho, Chiyoda-ku
Tokyo 102, Japan
Telephone: +813 3 32219551
Fax: +813 3 32219649

Global Van Japan Inc.
6 Rokubanchō
Chiyoda-ku
Tokyo 102, Japan
Telephone: +81 3 32 21 61 31
Fax +81 3 32 21 61 32

International Digital Communications Inc.
6th Floor, Fujita Kanko Tranomon Bldg.
3-17-1 Toranomom
Minato-ku
Tokyo 105, Japan
Telephone: +81 3 54 70 51 41
Fax: +81 3 54 70 52 28
Telex: 2425667 idctyo j

International Telecom Japan Inc.
Tsukiji KY Bldg.
7-5, Tsukiji 4-chome
Chuo-ku
Tokyo 104, Japan
Telephone: +81 3 55 65 01 41
Fax: +81 3 55 65 00 07
Telex: +j28169 itj

Japan Telecom Co., Ltd.
1-7 Kudan-kita 4-chrome
Chiyoda-ku
Tokyo 104, Japan
Telephone: +81 3 32226681
Fax: +81 3 32226668

Kokusai Denshin Denwa Co. Ltd.
KDD Bldg., P.O. Box No.1
3-2, Nishi-Shinjuku 2-Chome
Tokyo 163-03, Japan
Telephone: +81 3 33 47 71 11
Fax: +81 3 33 47 70 00
Telex: kddtokyo j22500

Network Information Sercies Co. Ltd.
28-25 I-chome Shinkawa
Chuo-ku
Tokyo 104, Japan
Telephone: +81 3 32 62 87 11
Fax: +81 3 32 62 87 57

Nippon Telegraph and Telephone Corp. (NTT)
No. 1-6, Uchisaiwai-cho 1-Chome
Chiyoda-ku
Tokyo 100
Japan
Telephone: +81 3 35 09 32 56
Telex: 2225300 ntt hq j

Nippon Hoso Kyokai
(Japan Broadcasting Corporation)
NHK Broadcasting Centre
2-2-1, Jinnan
Shibuya-ku
Tokyo 150, Japan
Telephone: +81 3 34651111
Telex: 072 radiohk j22377

Nippon Minkan Hoso Renmei
(National Association of Commercial Broadcasters in Japan)
No. 3, Kioicho, Chiyoda-ku
Tokyo 100, Japan
Telephone: +81 3 32657481

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Kokusai Denshin Denwa Company Ltd.
Ownership: 4.500624%
Earth stations:
Ibaraki 3 (POR spare) 180.0
Ibaraki 4 (POR primary) 174.0
Yamaguchi 2 (IOR primary) 60.0
Yamaguchi 3 (IOR major path) 63.0
Japan has 5 transportable Earth Networks.

International Maritime Satellite Organization (Inmarsat)
Signatory: Kokusai Denshin Denwa Company Ltd.
Ownership: NA
Earth station:
Yamaguchi (IOR)
Yamaguchi (POR)

Domestic Satellite Network

Operator: Japan Communications Satellite Company, Inc. (JCSAT)
Telephone: +81 33 54 00 37 00
Fax: +81 33 34 37 66 20

Satellites:
JCSat 1 150°E
JCSat 2 154°E

Operator: Space Communications Corporation (SCC)
Telephone: +81 3 503-3170
Fax: +81 3 503-3197

Satellites:
Superbird NA

Operators: Telecommunications Satellite Corporation of Japan (TSCJ)

National Space Development Agency of Japan (NASDA)

Satellites:
BS-2B 110°E
BS-3A 110°E
BS-3B 110°E
CS-2A 126.5°E
CS-2B 128.5°E
CS-3A 128°E
CS-3B 132°E

Range of Geostationary Satellites Visible

Location Kagoshima
Lat.° 31.6N
Long.° 130.5E
°Long. Differ. Visible 74°
Eastern Limit for GSO 205°E

Western Limit for GSO 57°E

Location Sapporo
Lat.° 43.0N
Long.° 141.3E
°Long. Differ. Visible 71°
Eastern Limit for GSO 212°E
Western Limit for GSO 70°E

Location Tokyo
Lat.° 35.7N
Long.° 139.7E
°Long. Differ. Visible 73°
Eastern Limit for GSO 213°E
Western Limit for GSO 67°E

■ JAVA (INDONESIA)

Range of Geostationary Satellites Visible

Location Java
Lat.° 7.0S
Long.° 110.0E
°Long. Differ. Visible 76°
Eastern Limit for GSO 186°E
Western Limit for GSO 34°E

■ KOREA, NORTH

Official name: Democratic People's Republic of Korea
 Capital: Pyongyang
 ITU country abbreviation: NA
 ITU Region: 3

International telephone dialing code: 850
 International telex dialing code: NA

Demographic and Physical Information

Area: 120,540 km²
 Population: 22.23 million
 Major languages: Korean
 Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: NA
 Submarine cable connections: NA
 Radio stations: 18 AM
 Television standard: PAL D
 Electrical standard: NA
 State-run television networks: 1
 Private television networks: none
 Television stations: 11
 Television sets: 340,000
 Television households: 200,000
 Cable penetration: none
 VCR penetration: NA
 Satellite Earth stations: 1 Intelsat IOR

Telecommunications Regulatory Organization

Ministry of Posts and Telecommunications
 Central District, Pyongyang, Korea, Democratic People's Republic
 Telephone: +850 2 36344
 Fax: +850 2 814418

Officials

Kim Hak Seub, Minister of Posts and Telecommunications; Chang Bong Jin, Vice-Minister of Posts and Telecommunications; Chon Dok Chil, Vice-Minister of Posts and Telecommunications

Broadcasting Services

Korean Central TV Station
 Ministry of Posts and Telecommunications
 Central District, Pyongyang, Korea, Democratic People's Republic
 Telephone: +850 2 36344
 Fax: +850 2 81 44 18

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
 Signatory: Deprelint Pyongyang
 Ownership: NA
 Earth stations:
 Pyongyang (IOR primary) 60.0

International Organization of Space Communications (Intersputnik)

Range of Geostationary Satellites Visible

Location Pyongyang
 Lat.° 38.4N
 Long.° 127.3E
 ° Long. Differ. Visible 73°
 Eastern Limit for GSO 200°E
 Western Limit for GSO 54°E

■ KOREA, SOUTH

Official name: Republic of Korea
 Capital: Seoul
 ITU country abbreviation: KOR
 ITU Region: 3

International telephone dialing code: 82
 International telex dialing code: 787

Demographic and Physical Information

Area: 98,480 km²
 Population: 44.15 million
 Major languages: Korean
 Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 4.8 million
 Submarine cable connections: none
 Radio stations: 79 AM, 46 FM
 Television standard: NTSC M
 Electrical standard: 110 vac, 60 Hz
 State-run television networks: 2
 Private television networks: 1
 Television stations: 256
 Television sets: 12.5 million
 TV households: 10.6 million
 Cable penetration: none
 VCR penetration: 40%
 Satellite Earth stations: 2 Intelsat IOR, 3 Intelsat POR

Telecommunications Regulatory Organization

Ministry of Communications
 100, Sejong-ro, Chongro-gu, Seoul 110-777, Korea
 Telephone: +82 2 750-2222
 Fax: +82 2 750-2915

Officials

Yoon Dong Yoon, Minister of Communications;
 Kyong Sang-Hyun, Vice-Minister of Communications

Broadcasting Services

Korean Broadcasting System - KBS
 18 Yoido-Dong, Youngdungpo-Gu
 Seoul 150, Korea
 Telephone: +82 2 781-1000
 Fax: +82 2 781-2499
 Telex: +787 (801-US) 24599

Munhwa Broadcasting Corporation - MBC
 31 Yoido-Dong, Youngdungpo-Gu
 Seoul 150-728, Korea
 Telephone: +82 2 784000
 Fax: +84 2 782-3094
 Telex: 787 (801-US) 22203

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
 Signatory: Korea Telecom/KTA Souel
 Ownership: 1.421507
 Earth stations:
 Boeun 1 (POR primary) 174.0
 Boeun 2 (IOR major path) 63.0
 Kum San 1 (POR spare) 186.0
 Kum San 2 (IOR primary) 60.0
 Kum San 3 (POR spare) 180.0

Other Recognized Operators

Korean Telecom
 100 Sejong-ro, Chongro-gu
 Seoul 110-770 Korea
 Telephone: 822 2750 3816
 Fax: 822 2 750 3830

International Maritime Satellite Organization (Inmarsat)

Signatory: Korea Telecom
 Ownership: NA
 Earth station:
 Kum San (POR)

Range of Geostationary Satellites Visible

Location Seoul
 Lat.° 37.5N
 Long.° 127E
 ° Long. Differ. Visible 73°
 Eastern Limit for GSO 200°E
 Western Limit for GSO 54°E

■ LAOS

Official name: Lao People's Democratic Republic
 Capital: Vientiane
 ITU country abbreviation: LAO
 ITU Region: 3

International telephone dialing code: 856
 International telex dialing code: 715

Demographic and Physical Information

Area: 236,800 km²
 Population: 4.44 million
 Major languages: Lao (official); French, English
 Time zones: GMT + 7h

Telecommunications Statistics

Number of telephones: 7,390
 Submarine cable connections: none
 Radio stations: 10 AM
 Television standard: PAL
 Electrical standard: 220 vac, 50 Hz
 State-run television networks: 1
 Private television networks: none
 Television stations: 1
 Television sets: 35,000
 TV households: 35,000
 Cable penetration: none
 VCR penetration: NA
 Satellite Earth stations: 1

Telecommunications Regulatory Organization

Ministere des Communications, Transports, Postes et de la Construction
 Departement des Postes et Telecommunications,
 rue Jawaharlal Nehru, 0100 Vientiane, Laos
 Telephone: + 856 4599

Officials

S.E.M. Bouathong, Ministre des Communications

Enterprise d'Etat des Postes et
 Télécommunications Laos (EPTL)
 Avenue Lane Xang
 Vientiane, Laos (R.d.dp.)
 Telephone: +856 4317
 Telex: 4317

Officials

Xieng Sone Phila, Director General EPTL

Broadcasting Services

Loas National TV - LTV
 P.O. Box 310 Vientiane, Laos
 Telephone: +856 5075

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite
 Organization (Intelsat)
 Signatory: EPTL Laos
 Ownership: NA
 Earth stations: NA

International Organization of Space Communica-
 tions (Intersputnik)

Range of Geostationary Satellites Visible

Location Vientiane
 Lat.° 18N
 Long.° 102.6E
 ° Long. Differ. Visible 76°
 Eastern Limit for GSO 178°E
 Western Limit for GSO 26°E

■ MACAU (PORTUGAL)

Status: overseas territory of Portugal (until 1999)
 ITU abbreviation: MAC
 ITU Region: 1

International telephone dialing code: 853
 International telex dialing code: 797

Demographic and Physical Information

Area: 16 km²
 Population: 473,333
 Major languages: Portuguese (official); Cantonese
 Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 52,000
 Submarine cable connections: NA
 Radio stations: 4 AM, 3 FM
 Television standard: PAL
 Electrical standard: 200 vac, 50 Hz
 State-run television networks: none
 Private television networks: 1
 Television stations: 1
 Television sets: NA
 TV households: 150,000
 Cable penetration: none
 VCR penetration: NA
 Satellite Earth stations: 1 Intelsat IOR

Telecommunications Regulatory Organization

Direccao dos Servicos de Correios
 e Telecomunicacoes, CTT
 Largo do Senado
 Macau
 Telephone: +853 574491
 Fax: +853 336603
 Telex: 88230 ctma om

Broadcasting Services

Teledifussao de Macau, S.A.R.L.
 Caixa Postal 466, Macau
 Telephone: +853 550152
 Fax: +853 310590
 Telex: +88309 radio om

Other Recognized Operators

Companhia de Telecomunicacoes de Macau,
 S.A.R.L.
 Caixa postal 868, Macau
 Telephone: +853 552211
 Fax: +853 593107
 Telex: 88399 tmmac om

Range of Geostationary Satellites Visible

Location Macau
 Lat.° 22.3N
 Long.° 113.6E
 ° Long. Differ. Visible 75°
 Eastern Limit for GSO 189°E
 Western Limit for GSO 39°E

■ MALAYSIA

Official name: Malaysia
 Capital: Kuala Lumpur
 ITU country abbreviation: MLA
 ITU Region: 3

International telephone dialing code: 60
 International telex dialing code: 784

Demographic and Physical Information

Area: 329,750 km²
 Population: 18.41 million
 Major languages: Malay (official); English,
 Chinese
 Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 994,860
 Submarine cable connections: 2
 Radio stations: 28 AM, 3 FM
 Television standard: VHF: PAL B; UHF: PAL G
 Electrical standard: 240 vac, 50 Hz
 State-run television networks: 1
 Private television networks: 1
 Television stations: 33
 Television sets: 3 million
 TV households: 2.5 million
 Cable penetration: none
 VCR penetration: 43%
 Satellite Earth stations: 2 Intelsat IOR, 2 Intelsat
 POR

Telecommunications Regulatory Organization

Jabatan Telekom Malaysia (JTM)
 Ministry of Energy, Telecommunications
 Wisma Damansara, Jalan Semantan, 50668 Kuala
 Lumpur, Malaysia
 Telephone: +60 3 255-6687
 Fax: +60 3 255-7901

Officials

Dato' Seri S. Samy Vellu, Minister, Haji ato' Mohd Tojot Roslli Ghazwi, Deputy Minister, Haji Mohamed Ali Yusoff, Director General, JTM; Haji Mohamed Anuar Khalid, Deputy Director-General, JTM

Broadcasting Services

Radio Television Malaysia - RTM
Department of Broadcasting
Angkasapuri 50610 Kuala Lumpur, Malaysia
Telephone: +60 3 274 5333
Fax: +60 3 282-4735
Telex: +084 rtmtv ma 31383

Sistem TV Malaysia Berhad - TV3
7th-9th Floor, KUB Building, off Jin Syed Putra
58000 Kuala Lumpur, Malaysia
Telephone: +60 3 274-3111
Fax: +60 3 274-8896
Telex: +784 33014

TV Malaysia Sabah Nad Sarawak
P.O. Box 1016, 88614 Kota Kinabalu, Malaysia
Telephone: +60 88 52711
Telex: 784 80061

Other Recognized Operators

Syarikat Telekom Malaysia Bhd (STM)
Locked Bag 5005
15th Floor, Wisma Telekom
Jalan Pantai Baru
59990 Kuala Lumpur, Malaysia
Telephone: +60 3 2329494
Fax: +60 3 7557316
Telex: 30268 stmint

STM Cellular Communications Sdn. Bhd.
(CELCOM)
3rd Floor, RHB 1
424, Jalan Tun Razak
50400 Kuala Lumpur, Malaysia
Telephone: +60 3 9849900
Fax: +60 3 9849300
Telex: 32320 Fleet

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Syarikat Telekom Malaysia Berhad (STM Telekom)
Ownership: 0.728871%
Earth stations:
Angkasapuri 1 (IOR major path) 63.0
Kuantan 1 (POR operational spare) 180.0
Kuantan 2 (POR primary) 174.0
Melaka 1 (IOR primary) 60.0

International Maritime Satellite Organization (Inmarsat)
Signatory: Syarikat Telekom Malaysia Berhad (STM Telekom)
Ownership: NA
earth station: none

Range of Geostationary Satellites Visible

Location Kuala Lumpur
Lat.° 3.1N
Long.° 101.7E
° Long. Differ. Visible 76°
Eastern Limit for GSO 178°E
Western Limit for GSO 26°E

■ MALDIVES

Official name: Republic of Maldives
Capital: Maale
ITU country abbreviation: MLD
ITU Region: 3

International telephone dialing code: 960
International telex dialing code: NA

Demographic and Physical Information

Area: 300 km²
Population: 234,371
Major languages: Divehi, English
Time zones: GMT + 5h

Telecommunications Statistics

Number of telephones: 2,804
Submarine cable connections: none
Radio stations: 2 AM, 1 FM
Television standard: PAL B
Electrical standard: 230 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 1
Television sets: 5,000
TV households: 5,000
Cable penetration: none
VCR penetration: 45%
Satellite Earth stations: 1 Intelsat IOR

Telecommunications Regulatory Organization

Department of Posts and Telecommunications
34 Marine Drive, Male' 2002, Maldives
Telephone: +960 323344

Officials

Riluvan Shareef, Director General, Posts and Telecommunications; Hussain Shareef, Director, Posts and Telecommunications

Broadcasting Services

Department of Information and Broadcasting
Ghaazee Bldg.
Male' 2005, Maldives
Telephone: +960 322252
Telex: 66085 hoadhum mf

Other Recognized Operators

DHIRAAGU
(Dhivehi Raajjey Ge Gulhun Private Ltd.)
Operations and Commercial Dept.
P.O. Box 2082
Male' 2082, Maldives
Telephone: 960 322802
Fax: 960 322 800

International Telecommunication Organization Membership

International Telecommunication Union (ITU)

Range of Geostationary Satellites Visible

Location Male
Lat.° 5N
Long.° 73E
° Long. Differ. Visible 76°
Eastern Limit for GSO 149°E
Western Limit for GSO 357°E (3°W)

■ MARSHALL ISLANDS

Official name: Republic of the Marshall Islands
Capital: Majuro
ITU country abbreviation: MRL
ITU Region: 3

International telephone dialing code: 692
International telex dialing code: NA

Demographic and Physical Information

Area: 181 km²
Population: 50,004
Major languages: English (official); Marshalese
Time zones: GMT + 12h

Telecommunications Statistics

Number of telephones: <1000
Submarine cable connections: none
Radio stations: 1 AM, 2 FM
Television standard: NA
Electrical standard: NA
State-run television networks: NA
Private television networks: NA
Television stations: 2
Television sets: NA
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations: 2 Intelsat POR

Telecommunications Regulatory Organization

Ministry of Transport and Communications
Cabinet Bldg.
P.O. Box 2
Majuro 96960, Marshall Islands
Telephone: +692 9 3445
Fax: +692 9 4020
Telex: radiomar 36687 m

Officials

Mr. Kunio D. Lemari, Minister of Transportation and Communications

International Telecommunications Organization Membership

none

Range of Geostationary Satellites Visible

Location Majuro
Lat.° 9N
Long.° 171W
°Long. Differ. Visible 76°
Eastern Limit for GSO 246°E
Western Limit for GSO 95°E

■ MICRONESIA, FEDERATED STATES OF

Official name: Federated States of Micronesia
Capital: Kolonia
ITU country abbreviation: none
ITU Region: 3

International telephone dialing code: 691
International telex dialing code: NA

Demographic and Physical Information

Area: 702 km²
Population: 114,694
Major languages: English
Time zones: GMT + 10h

Telecommunications Statistics

Number of telephones: 960
Submarine cable connections: none
Radio stations: 5 AM, 1 FM, 1 shortwave
Television standard: NA
Electrical standard: NA
State-run television networks: NA
Private television networks: NA
Television stations: 6
Television sets: NA
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations: NA

International Telecommunications Organization Membership

none

Range of Geostationary Satellites Visible

Location Kolonia
Lat.° 9N
Long.° 150E
°Long. Differ. Visible 76°
Eastern Limit for GSO 226E
Western Limit for GSO 74°E

■ MIDWAY ISLANDS (UNITED STATES)

Range of Geostationary Satellites Visible

Location Midway
Lat.° 28.2N
Long.° 177.4W
°Long. Differ. Visible 75°
Eastern Limit for GSO 252°E (107°W)
Western Limit for GSO 102°E

■ MONGOLIA

Official name: Mongolia
Capital: Ulaanbaatar
ITU country abbreviation: MNG
ITU Region: 1

International telephone dialing code: 976
International telex dialing code: 719

Demographic and Physical Information

Area: 1.57 million km²
Population: 2.31 million
Major languages: Khalkha Mongol
Time zones: GMT +8h

Telecommunications Statistics

Number of telephones: 63,000
Submarine cable connections: none
Radio stations: 12 AM, 1 FM
Television standard: SECAM D
Electrical standard: NA
State-run television networks: 1
Private television networks: none
Television stations: 1 (18 repeaters)
Television sets: 120,000
TV households: 88,000
Cable penetration: none
VCR penetration: NA
Satellite Earth stations: NA

Telecommunications Regulatory Organization

Ministry of Communications
Ulan Bator, Mongolia
Central Post Office 1104
Ulaan Baatar
Telephone: 20 820

Officials

H.E. Razdak Sandal Khan, Minister of Communications

Broadcasting Services

Mongolian TV Center
Ulan Bator, Mongolia

International Telecommunications Organization Membership

International Organization of Space Communications (Intersputnik)

Range of Geostationary Satellites Visible

Location Ulaanbaatar
Lat.° 47.9N
Long.° 106.9E
°Long. Differ. Visible 70°
Eastern Limit for GSO 177°E
Western Limit for GSO 37°E

■ MYANMAR (FORMERLY BURMA)

Official name: Union of Myanmar
Capital: Rangoon (Yangon)
ITU country abbreviation: BRM
ITU Region: 3

International telephone dialing code: 95
International telex dialing code: 713

Demographic and Physical Information

Area: 678,500 km²
Population: 42.64 million
Major languages: Burmese
Time zones: GMT + 6h30m

Telecommunications Statistics

Number of telephones: 53,000
Submarine cable connections: none
Radio stations: 2 AM, 1 FM
Television standard: NTSC M
Electrical standard: 230 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 1
Television sets: 70,000
TV households: 68,000

Cable penetration: none
VCR penetration: NA
Satellite Earth stations: 1 Intelsat IOR

Telecommunications Regulatory Organization

Ministry of, Communications, Posts and Telegraphs
Myanmar Posts and Telecommunications Department, No. 125 Pansodan Street, Ground Floor, Yangon, Myanmar
Telephone: +95 1 86364
Fax +95 1 86365

Officials

Tin Tun, Minister of Communications, Posts and Telegraphs; U Shwe Than, Deputy Minister of Transport and Communications

Broadcasting Services

Burma Broadcasting Service
GPO Box 1432
Rangoon, Myanmar
Telephone: +95 1 31355
Telex: +713 21360

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Gentel Rangoon
Ownership: NA
Earth Stations: Rangoon (IOR primary) 60.0

Range of Geostationary Satellites Visible

Location Rangoon
Lat.° 16.7N
Long.° 96.3E
°Long. Differ. Visible 76°
Eastern Limit for GSO 172°E
Western Limit for GSO 20°E

■ NEPAL

Official name: Kingdom of Nepal
Capital: Kathmandu
ITU country abbreviation: NPL
ITU Region: 3

International telephone dialing code: 977
International telex dialing code: 947

Demographic and Physical Information

Area: 140,800 km²
Population: 20.09 million
Major languages: Nepali (official)
Time zones: GMT + 5h30m

Telecommunications Statistics

Number of telephones: 50,000
Submarine cable connections: none
Radio stations: 88 AM
Television standard: PAL
Electrical standard: 220 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 1
Television sets: 250,000
TV households: 50,000
Cable penetration: none
VCR penetration: NA
Satellite Earth stations: 1 Intelsat IOR

Telecommunications Regulatory Organization

Ministry of Information and Communication
Singha Durbar, Kathmandu, Nepal
Telephone: +977 1 220150
Fax: 977 1 227310

Officials

Bijaya Kumar Gachhedar, Minister of Communication; Jit Bahadur Manandhar, Secretary, Ministry of Communication

Broadcasting Services

Nepal Television - NTV - Channel 5
P.O. Box 3826, Singha Durbar
Panchayat Plaza
Kathmandu, Nepal
Telephone: +977 2 228447
Fax: +977 1 228312
Telex: +947 2548

Other Recognized Operators

Nepal Telecommunications Corporation
Central Office
Singhdurbar, Putli Bagaicha
Kathmandu, Nepal
Telephone: +977 1215444
Fax: +977 1 226260
Telex: 2201 Telcom np

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Nepal Telecommunications Corporation
Ownership: 0.090267%
Earth stations:
Sagamartha (IOR primary) 60.0

Range of Geostationary Satellites Visible

Location Kathmandu
Lat.° 27.7N
Long.° 85.3E
°Long. Differ. Visible 75°
Eastern Limit for GSO 160°E
Western Limit for GSO 10°E

■ NEW CALEDONIA (FRANCE)

Official name: Territory of New Caledonia and Dependencies
Status: overseas territory of France
Capital: Nouméa
ITU abbreviation: NCL
ITU Region: 3

International telephone dialing code: 687
International telex dialing code: NA

Demographic and Physical Information

Area: 19,060 km²
Population: 174,805
Major languages: French
Time zones: GMT + 12h

Telecommunications Statistics

Number of telephones: 32,578
Submarine cable connections: none
Radio stations: 5 AM, 3 FM
Television standard: SECAM
Electrical standard: 220 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 7
Television sets: NA
TV households: 41,000
Cable penetration: none
VCR penetration: NA
Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Direction de l'Office des Postes et des Télécommunications
Noumea
Nouvelle-Calédonie
BP N. A1
Noumea
Nouvelle-Calédonie
Telephone: +687 261642
Fax: +687 285983
Telex: 0706 3800

France Cables et Radio (FCR)
Télécommunications extérieures de la Nouvelle Calédonie
BP No. A1
Noumea
Nouvelle-Calédonie
Telephone: +687 261642
Fax: +687 285983

Range of Geostationary Satellites Visible

Location Nouméa
Lat.° 21.3S
Long.° 166.5E
°Long. Differ. Visible 75°
Eastern Limit for GSO 242°E
Western Limit for GSO 92°E

■ NEW ZEALAND

Official name: New Zealand
 Capital: Wellington
 ITU country abbreviation: NZL
 ITU Region: 3

International telephone dialing code: 64
 International telex dialing code: 791

Demographic and Physical Information

Area: 268,680
 Population: 3.35 million
 Major languages: English (official); Maori
 Time zones: GMT + 12h

Telecommunications Statistics

Number of telephones: 2.11 million
 Submarine cable connections: 2
 Radio stations: 64 AM, 2 FM
 Television standard: VHF: PAL B; UHF: PAL G
 Electrical standard: 230 vac, 50 Hz
 State-run television networks: 1
 Private television networks: 2
 Television stations: 14
 Television sets: 1.25 million
 TV households: 1.0 million
 Cable penetration: none
 VCR penetration: 64%
 Satellite Earth stations: 4 Intelsat POR

Telecommunications Regulatory Organization

Ministry of Commerce
 Communications Division
 P.O. Box 1473
 Wellington, New Zealand
 Telephone: +64 4 720030
 Fax: (2/3)+64 4 4990797

Officials

H.M. Donaldson, General Manager, Communications

Broadcasting Services

Television New Zealand - TVNZ
 (TVNZ has two channels: Television One and Channel Two)
 P.O. Box 3819
 Auckland, New Zealand
 Telephone: +64 977-9730
 Fax: +64 975-0979
 Telex: +791 63047

TVNZ - Television One (News and Information)
 P.O. Box 30945
 Lower Hutt, Wellington, New Zealand
 Telephone: +64 466-6969
 Fax: +64 465-8959
 Telex: +791 3867

TVNZ - Network Two (Entertainment)
 Network Center
 100 Victoria Street
 P.O. Box 3819, Auckland, New Zealand
 Telephone: +64 979-2700
 Fax: +64 975-0828
 Telex: +791 60056

TV3 - New Zealand
 Private Bag, Auckland, New Zealand
 Telephone: +64 977-9730
 Fax: +64 9 366-7029

Canterbury Television - CTV
 P.O. Box 3741, Christchurch, New Zealand
 Telephone: +64 3 365-5505
 Fax: +64 3 365-5773

Sky Network Television LTD
 P.O. Box 9059
 Newmarket, Auckland, New Zealand
 Telephone: +64 9 579-9999
 Fax: +64 9 579-0910

Other Recognized Operators

Telecom Networks and International Ltd. (TNI)
 Telecom Corp. of New Zealand Ltd.
 P.O. Box 1092
 Wellington, New Zealand
 Telephone: +64 473-8444
 Fax: +2(3) +64 473-1399
 Telex: Telint nz 31688

International Telecommunications Organization Membership

International Telecommunication Union (ITU)
 International Telecommunications Satellite Organization (Intelsat)
 Signatory: Telecom Corporation of New Zealand
 Ownership: 0.661044%
 Earth stations:
 Rangiora 1 (POR spare) 180.0
 Warworth 1 (POR spare) 180.0
 Warworth 2 (POR primary) 174.0
 Wellington 1 (POR spare) 180.0

International Maritime Satellite Organization (Inmarsat)
 Signatory: Telecom Corporation of New Zealand
 Ownership: NA
 Earth station: none

Range of Geostationary Satellites Visible

Location	Wellington
Lat.°	41.3S
Long.°	174.8E
°Long. Differ. Visible	72°
Eastern Limit for GSO	247°E
Western Limit for GSO	103°E

■ NIUE

Status: self-governing with free association with New Zealand
 Capital: Alofi
 ITU abbreviation: NIU
 ITU Region: 3

International telephone dialing code: NA
 International telex dialing code: NA

Demographic and Physical Information

Area: 260 km²
 Population: 1,751
 Major languages: Polynesian, English
 Time zones: GMT -10 h

Telecommunications Statistics

Number of telephones: 383
 Submarine cable connections: none
 Radio stations: 1 AM, 1 FM
 Television standard: NA
 Electrical standard: NA
 State-run television networks: NA
 Private television networks: NA
 Television stations: none
 Television sets: NA
 TV households: NA
 Cable penetration: NA
 VCR penetration: NA
 Satellite Earth stations: NA

Telecommunications Regulatory Organization

Director of Posts and Telecommunications
 Alofi, Niue
 Telephone: +184
 Telex: nf67013 niucom

Range of Geostationary Satellites Visible

Location	Alofi
Lat.°	19.0S
Long.°	169.9W
°Long. Differ. Visible	76°
Eastern Limit for GSO	266°E (94°W)
Western Limit for GSO	114°E

■ NORFOLK ISLAND (AUSTRALIA)

Range of Geostationary Satellites Visible

Location	Norfolk
Lat.°	29.0S
Long.°	168.0E
°Long. Differ. Visible	75°
Eastern Limit for GSO	242°E
Western Limit for GSO	93°E

■ NORTH KOREA

see Korea, North

■ NORTHERN MARIANA ISLANDS

Official name: Commonwealth of the Northern Mariana Islands
Status: commonwealth in political union with the United States
ITU abbreviation: none
ITU Region: 3

International telephone dialing code: NA
International telex dialing code: NA

Demographic and Physical Information

Area: 477 km² (total of 16 islands)
Population: 47,168
Major languages: English, Chamorro, Carolinian
Time zones: GMT - 10 h

Telecommunications Statistics

Number of telephones: NA
Submarine cable connections: NA
Radio stations: 2 AM, 1 FM
Television standard: NA
Electrical standard: NA
State-run television networks: NA
Private television networks: NA
Television stations: 1
Television sets: NA
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations: 2 Intelsat POR

Range of Geostationary Satellites Visible

Location Saipan
Lat.° 15.2N
Long.° 145.8E
°Long. Differ. Visible 76°
Eastern Limit for GSO 222°W (138°W)
Western Limit for GSO 70°E

■ PAKISTAN

Official name: Islamic Republic of Pakistan
Capital: Islamabad
ITU country abbreviation: PAK
ITU Region: 3

International telephone dialing code: 92
International telex dialing code: 952

Demographic and Physical Information

Area: 8033,940 km²
Population: 121.66 million
Major languages: Urdu and English (both official), Punjabi
Time zones: GMT + 5h

Telecommunications Statistics

Number of telephones: 813,000
Submarine cable connections: none
Radio stations: 19 AM, 8 FM
Television standard: VHF: PAL B; UHF: PAL G
Electrical standard: 220 vac, 50 Hz
State-run television networks:
Private television networks: 1
Television stations: 29
Television sets: 7 million
TV households: NA
Cable penetration: none
VCR penetration: NA
Satellite Earth stations: 2 Intelsat IOR, 1 Intelsat AOR

Telecommunications Regulatory Organization

Pakistan Telecommunication Corporation
Headquarters, Rizwan Centre 85 West
Islamabad, Pakistan
Telephone: +92 51 843991
Fax: +92 51 851307

Officials

Mian Mohammad Javed, Chairman, Pakistan Telecommunications

Broadcasting Services

Pakistan Television Corp.
P.O. Box 1221
Constitution Ave.
Islamabad, Pakistan
Telephone: +92 51 828651/5
Fax: +92 51 823406
Telex: 952 5833

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Government of the Islamic Republic of Pakistan
Ownership: 0.726073%
Earth stations:
Deh Mandro 1 (IOR primary) 60.0
Deh Mandro 2 (AOR spare) 359.0
Mallach (IOR major path) 63.0

International Maritime Satellite Organization (Inmarsat)
Signatory: Government of the Islamic Republic of Pakistan
Ownership: NA
Earth station: none

Range of Geostationary Satellites Visible

Location Islamabad
Lat.° 33.7N
Long.° 73.2E
°Long. Differ. Visible 74°
Eastern Limit for GSO 147°E
Western Limit for GSO 359°E (1°W)

■ PALAU

(Note: also called Trust Territory of the Pacific Islands, and Belau)

Official name: Trust Territory of the Pacific Islands
Capital: Koror (new capital under construction at Babelthup)
ITU country abbreviation: none
ITU Region: 3

International telephone dialing code: NA
International telex dialing code: NA

Demographic and Physical Information

Area: 458 km²
Population: 15,775
Major languages: English (official); Palauan
Time zones: GMT GMT + 9 h

Telecommunications Statistics

Number of telephones: NA
Submarine cable connections: NA
Radio stations: 1 AM, 1 FM
Television standard: NA
Electrical standard: NA
State-run television networks: NA
Private television networks: NA
Television stations: 2
Television sets: NA
TV households: NA
Cable penetration: NA
VCR penetration: NA
Satellite Earth stations: 1 Intelsat POR

International Telecommunications Organization Membership

none (under United States Trusteeship, and has voted to enter a Compact of Free Association with the U.S., but this has not entered into force)

Range of Geostationary Satellites Visible

Location Palau
Lat.° 7.5N
Long.° 130.5E
°Long. Differ. Visible 75°
Eastern Limit for GSO 205°E
Western Limit for GSO 55°E

■ PAPUA NEW GUINEA

Official name: Independent State of Papua New Guinea

Capital: Port Moresby

ITU country abbreviation: PNG

ITU Region:

International telephone dialing code: 675

International telex dialing code: 794

Demographic and Physical Information

Area: 461,690 km²

Population: 4.01 million

Major languages: pidgin English, >715 other languages

Time zones: GMT + 10h

Telecommunications Statistics

Number of telephones: 51,700

Submarine cable connections: 2

Radio stations: 31 AM, 2 FM

Television standard: VHF: PAL B; UHF: PAL G

Electrical standard: 240 vac, 50 Hz

State-run television networks: none

Private television networks: 1

Television stations: 2

Television sets: 200,000

TV households: NA

Cable penetration: none

VCR penetration: NA

Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Posts and Telecommunications Corporation

P.O. Box 1349

Boriko, Papua New Guinea

Telephone: +675 274111

Fax: +675 213163

Officials

Dale P. Kamara, Director, Corporate Relations;

R.M. Elias, Managing Director; Alan G. Brooks,

General Manager, Telecommunications; Clark

Kuliniasi, Executive Manager, International

Broadcasting Services

EMTV

P.O. Box 443

Boroko, Port Moresby, Papua New Guinea

Telephone: +675 9 25 73 22

Fax: +675 9 25 44 50

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)

Signatory: Posts and Telecommunication

Corporation of New Guinea

Ownership: 0.050000%

Earth stations:

Port Moresby (POR primary) 174.0

Range of Geostationary Satellites Visible

Location Port Moresby

Lat.° 9.4S

Long.° 147.1E

° Long. Differ. Visible 76°

Eastern Limit for GSO 223°E

Western Limit for GSO 71°E

■ PHILIPPINES

Official name: Republic of the Philippines

Capital: Manila

ITU country abbreviation: PHL

ITU Region: 3

International telephone dialing code: 63

International telex dialing code: 712, 722, 732, 742, 762

Demographic and Physical Information

Area: 300,000 km²

Population: 67.11 million

Major languages: Filipino, English

Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 872,900

Submarine cable connections: 5

Radio stations: 267 AM, 55 FM

Television standard: NTSC M

Electrical standard: 110 vac, 60 Hz

State-run television networks: 1

Private television networks: 4

Television stations: 33

Television sets: 4 million

TV households: 4 million

Cable penetration: NA

VCR penetration: 23%

Satellite Earth stations: 1 Intelsat IOR, 1 Intelsat POR

Telecommunications Regulatory Organization

Department of Transportation and Communications

National Telecommunications Commission, Vibal

Building, Epifanio de los Santos Avenue, Corner

Times Street, Quezon City, Philippines

Telephone: +63 2 981160

Fax: +63 2 9217128

Officials

Pete Nicomedes Prado, Secretary; Josefina

Trinidad Lichauco, Undersecretary for Communications

Broadcasting Services

ABS/CBN Channel 2

Mother Ignacia

Corner E.A. Esguerra Ave.

Quezon City, Philippines

Telephone: +63 2 99 45 10 to 19

Fax: +63 2 924 1568

Telex: +722 65814 ABSCBN PN

GMA Channel 7

Broadcast City, Capital Hill, Diliman

Quezon City, Philippines

Telephone: +63 2 99 70 21

Fax: +63 2 922 7954

Telex: +722 27899

RPN Channel 9

Broadcast City, Capital Hill, Diliman

Quezon City, Philippines

Telephone: +63 2 96 86 12

Fax: +63 2 96 85 56

Telex: +722 63886

IBC Channel 13

Broadcast City, Capital Hill, Diliman

Quezon City, Philippines

Telephone: +63 2 97 76 61

Telex: +722 63886

PTV Channel 4

Bohol Avenue

Quezon City, Philippines

Telephone: +63 2 921 6160 or 921 6969

Telex: +722 42220

Other Recognized Operators

Capital Wireless Inc.

6/F Dolmar Gold Tower

107 Carlos Palanca Jr.

Legaspi Village

Makati Metro Manila, Philippines

Telephone: +63 2 8159961 to 65

Fax: +63 2 8175410

Telex: (75) 14899 cwi hq ps

Globe-Mackay Cable and Radio Corp.

669 United Nations Avenue

P.O. Box 770 Maila 1000

Ermita Metro Manila, Philippines

Telephone: +63 2 5213550

Telex: 40005 pm gmer

Philippine Communications Satellite Corp.

Telecom Plaza

Gil J. Puyat Ave.

Makati Metro Manila, Philippines

Telephone: +63 2 8158406

Telex: philcom 722 2196 potc ph

Philippines Global Communications Inc.

8755 Paseo de Roxas

CC P.O. Box 960

Makati Metro Manila 3117, Philippines

Telephone: +63 2 879971

Telex: (752) 2222 eng ph

Philippines Long Distance Telephone Co.
Ramon Cojuangco Bldg.
Legaspi Village
P.O. Box 952 MCC
Makati Metro Manila, Philippines
Telephone: + 63 2 8174600
Telex: rca 722 22195

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Philippine Communications Satellite Corporation (PHILCOMSAT)
Ownership: 0.640919%
Earth stations:
Pinguay 1 (POR primary) 174.0
Pinguay 2 (IOR primary) 60.0

International Maritime Satellite Organization (Inmarsat)
Signatory: Philippine Communications Satellite Corporation (PHILCOMSAT)
Ownership: NA
Earth station: none

Range of Geostationary Satellites Visible

Location Manila
Lat.° 14.7N
Long.° 121.0E
°Long. Differ. Visible 76°
Eastern Limit for GSO 197°E
Western Limit for GSO 45°E

■ PITCAIRN ISLANDS (UNITED KINGDOM)

Official name: Pitcairn, Henderson, Ducie and Oeno Islands
Capital: Adamstown
Status: dependent territory of the United Kingdom
ITU abbreviation: none
ITU Region: 3
International telephone dialing code: NA
International telex dialing code: NA

Demographic and Physical Information

Area: 47 km²
Population: 52
Major languages: English (official), Tahitian
Time zones: GMT - 8h

Telecommunications Statistics

Number of telephones: 24
Submarine cable connections: none
Radio stations: 1 AM
Television standard: none
Electrical standard: NA
State-run television networks: none
Private television networks: none
Television stations: none
Television sets: none
TV households: none
Cable penetration: none
VCR penetration: none
Satellite Earth stations: none

Range of Geostationary Satellites Visible

Location Pitcairn
Lat.° 25.1S
Long.° 130.1W
°Long. Differ. Visible 75°
Eastern Limit for GSO 205°E
Western Limit for GSO 305°E (55°W)
Fax: 095-200-3283/210-9986

■ SINGAPORE

Official name: Republic of Singapore
Capital: Singapore
ITU country abbreviation: SNG
ITU Region: 3

International telephone dialing code: 65
International telex dialing code: 786

Demographic and Physical Information

Area: 633 km²
Population: 2.79 million
Major languages: Chinese, Malay, Tamil, English (all official)
Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 1.11 million
Submarine cable connections: 3
Radio stations: 13 AM, 4 FM
Television standard: VHF: PAL B; UHF: PAL G
Electrical standard: 230 vac, 50 Hz
State-run television networks: 1
Private television networks: none
Television stations: 2
Television sets: 600,000
TV households: 600,000
Cable penetration: none
VCR penetration: 76%
Satellite Earth stations: 2 Intelsat IOR, 3 Intelsat POR

Telecommunications Regulatory Organization

Telecommunication Authority of Singapore
Comcenter
31, Exeter Road
Singapore 0923, Singapore
Telephone: +65 738 7788
Fax: +65 733 0073

Officials

H.E. Mah Bow tan, Minister for Communications;
Ng Hong Yew, Director General

Other Recognized Operators

Singapore Telecommunications Private Limited
(Singapore Telecom)
International Affairs/Regulatory Function
#18-00 Comcentre
31 Exeter Road
Singapore 0923, Singapore
Telephone: +65 734 3344
Fax: +65 733 3351

Broadcasting Services

Singapore Broadcasting Corporation - SBC
Farrer Road
P.O. Box 60
Singapore 9128, Singapore
Telephone: +65 256 0401
Fax: +65 253 8808
Telex: +786 39265

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Telecommunications Authority of Singapore/Telecom Singapore
Ownership: 2.007955%
Earth stations:
Bukit Timah 1 (IOR primary) — 60.0
Bukit Timah 2 (POR primary) — 174.0
SBC 1B (POR spare) — 180.0
Sentosa 1 (IOR major path) — 63.0
Sentosa 2 (POR primary) — 174.0

International Maritime Satellite Organization (Inmarsat)
Signatory: Telecommunications Authority of Singapore
Ownership: NA
Earth station:
Singapore (POR)

Range of Geostationary Satellites Visible

Location Singapore
Lat.° 1.3N
Long.° 103.8E
°Long. Differ. Visible 76°
Eastern Limit for GSO 180°E
Western Limit for GSO 28°E

■ SOLOMON ISLANDS

Official name: Solomon Islands
Capital: Honiara
ITU country abbreviation: SLM
ITU Region: 3

International telephone dialing code: 677
International telex dialing code: NA

Demographic and Physical Information

Area: 28,450 km²
Population: 360,010
Major languages: Melanesian pidgin
Time zones: GMT + 11h

Telecommunications Statistics

Number of telephones: 3,000
Submarine cable connections: NA
Radio stations: 4 AM
Television standard: none
Electrical standard: NA
State-run television networks: none
Private television networks: none
Television stations: none
Television sets: none
TV households: none
Cable penetration: none
VCR penetration: none
Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Ministry of Posts and Telecommunications
P.O. Box G25
Honiara, Solomon Islands
Telephone: +677 21821
Fax: +677 21472

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

Range of Geostationary Satellites Visible

Location Honiara
Lat.° 9.4S
Long.° 159.9E
°Long. Differ. Visible 76°
Eastern Limit for GSO 236°E
Western Limit for GSO 84°E

■ SRI LANKA

Official name: Democratic Socialist Republic of Sri Lanka
Capital: Colombo
ITU country abbreviation: CLN
ITU Region: 3
International telephone dialing code: 94
International telex dialing code: 954

Demographic and Physical Information

Area: 65,610 km²
Population: 17.63 million
Major languages: Sinhala (official); Tamil, English
Time zones: GMT + 5h30m

Telecommunications Statistics

Number of telephones: 114,000
Submarine cable connections: 2
Radio stations: 12 AM, 5 FM
Television standard: PAL B
Electrical standard: 230 vac, 50 Hz
State-run television networks: 2
Private television networks: none
Television stations: 5
Television sets: 500,000
TV households: NA
Cable penetration: NA
VCR penetration: 37%
Satellite Earth stations: 2 Intelsat IOR

Telecommunications Regulatory Organization

The Director General of Telecommunications
E.H. Cooray Building, 1st Floor, 411 Galle Road,
Colombo 3, Sri Lanka
Telephone: +94 1 575003

Officials

A.M.S. Adikari, Minister of Posts and Telecommunications

Broadcasting Services

Sri Lanka Rupavahini Corporation - SLRC
P.O. Box 2204
Colombo, Sri Lanka
Telephone: +94 1 580131, 587722, or 501050/1/2/3/4/5
Fax: +94 1 580929
Telex: +954 22148

Independent Television Network - ITN
Wickramasinghepura, Battaramulla
P.O. Box 574
Colombo 7, Sri Lanka
Telephone: +94 1 564591 or 565491
Telex: +954 22445

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Government of Sri Lanka/ OTS Colombo
Ownership: 0.050000%
Earth stations:
Padukka (IOR primary) — 60.0
Trincomalee (IOR primary) — 60.0

International Maritime Satellite Organization (Inmarsat)
Signatory: Government of Sri Lanka
Ownership: NA
Earth station: none

Range of Geostationary Satellites Visible

Location Colombo
Lat.° 6.9N
Long.° 80E
°Long. Differ. Visible 76°
Eastern Limit for GSO 156°E
Western Limit for GSO 4°E
Fax: 11 75599

■ TAIWAN

Official name: Taiwan
Capital: Taipei
ITU country abbreviation: none
ITU Region: 3

International telephone dialing code: 886
International telex dialing code: 785

Demographic and Physical Information

Area: 35,980 km²
Population: 20.88 million
Major languages: Mandarin Chinese (official); Taiwanese
Time zones: GMT + 8h

Telecommunications Statistics

Number of telephones: 7.80 million
Submarine cable connections: 9
Radio stations: 91 AM, 23 FM
Television standard: NTSC
Electrical standard: 110 vac, 60 Hz
State-run television networks: 3
Private television networks: none
Television stations: 15 (13 repeaters)
Television sets: 6.5 million
TV households: 4.8 million
Cable penetration: NA
VCR penetration: 65%
Satellite Earth stations: 1 Intelsat IOR, 1 Intelsat POR

Telecommunications Regulatory Organization

Taiwan Television Enterprise - Channel 7
10, Pa Te Road
Section 3
Taipei 105, Taiwan
Telephone: +886 2 7725105
Fax: +886 2 7731335 or 7759634
Telex: +785 25714

Chinese Television System - Channel 9
100 Kuang Fu South Road
Taipei 10552, Taiwan
Telephone: +886 2 7510321
Fax: +886 2 7775414
Telex: +785 24159

China Television Company - Channel 11
53, 3rd Section
Jen Ai Road
Taipei, Taiwan
Telephone: +886 2 7838308
Fax: +886 2 7828776 or 7833069
Telex: +785 25080

China Public Television
5, Ching Tao E. Road
Taipei, Taiwan
Telephone: +886 2 2311350 or 3911397
Telex: +785 11636

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

International Telecommunication Satellite Organization (Intelsat)
Signatory: COMSAT FOR ITA
Ownership: NA
Earth stations:
Tapei 2 (POR primary) — 174.0
Tapei 3 (IOR primary) — 60.0

Range of Geostationary Satellites Visible

Location Taipei
Lat.° 25.1N
Long.° 121.5E
°Long. Differ. Visible 75°
Eastern Limit for GSO 196°E
Western Limit for GSO 47°E

THAILAND

Official name: Kingdom of Thailand
Capital: Bangkok
ITU country abbreviation: THA
ITU Region: 3

International telephone dialing code: 66
International telex dialing code: 788

Demographic and Physical Information

Area: 514,000 km²
Population: 57.62 million
Major languages: Thai, English
Time zones: GMT + 7h

Telecommunications Statistics

Number of telephones: 739,500
Submarine cable connections: NA
Radio stations: >500 AM, 100 FM
Television standard: VHF: PAL B; UHF: PAL G
Electrical standard: 220 vac, 50 Hz
State-run television networks: 5
Private television networks: 2
Television stations: 11
Television sets: 6.8 million
TV households: NA
Cable penetration: 1%
VCR penetration: 13%
Satellite Earth stations: 1 Intelsat IOR, 1 Intelsat POR

Telecommunications Regulatory Organization

Post and Telegraph Department
Soi Sailom, Phaholyothin Road
Bangkok 10400, Thailand
Telephone: +66 2 2713508
Fax: +66 2 2713514

Officials

Nukul Prachabmoh, Minister of Transport and Communications; Smith Tumsaroch, Director-General of Post and Telegraph Department, Executive; Somchit Chularat, Director of International Services; Sethaporn Cusripituck, Deputy Director-General, Technical

Broadcasting Services

Bangkok Entertainment Co., LTD - Thai TV Color - Channel 3
Vanit Building
1126/1 New Petchburi Road
Bangkok 101400, Thailand
Telephone: +66 2 2539970
Fax: +66 2 2539978
Telex: +788 82616

Bangkok Broadcasting & TV - BBTB - Channel 7
998/1 Phaholyothin Road
Bangkhon
Bangkok 10900, Thailand
Telephone: +66 2 2781255 - 60
Fax: +66 2 2711532
Telex: +788 82730

Television of Thailand - Channel 11
New Petchburi Road
Huay-Kwang
Bangkok 10310, Thailand
Telephone: +66 2 31821100
Fax: +66 2 3182991
Telex: +788 72171

Thai Television - Channel 9 - (MCOT)
222 Rama IX Road
Bangkok 10310, Thailand
Telephone: +66 2 2450700-19
Fax: +66 2 2451649
Telex: +788 84577

International Broadcasting Corporation Limited
1376/1 Nakornchaisri
Dusit, Bangkok 10310, Thailand
Telephone: + 66 2 2435300
Fax: +66 2 2435987
Telex: +788 72195

Other Recognized Operators

The Communications Authority of Thailand (CAT)
Bangkok 10002, Thailand
Telephone: +66 2 5735410
Fax: +66 2 5735413
Telex: 80006 cat th or 80023 cat th

International Telecommunication Organization Membership

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
Signatory: Government of Thailand
Ownership: 0.999491%
Earth stations:
Si Racha 1 (IOR primary) — 60.0
Si Racha 2 (POR primary) — 174.0

Range of Geostationary Satellites Visible

Location Bangkok
Lat.° 13.7N
Long.° 100.6E
°Long. Differ. Visible 76°
Eastern Limit for GSO 177°E
Western Limit for GSO 25°E
P.O. Box 3286

TOKELAU (NEW ZEALAND)

Status: territory of New Zealand
ITU abbreviation: TKL
ITU Region: 3

International telephone dialing code: NA
International telex dialing code: NA

Demographic and Physical Information

Area: 10 km²
Population: 1,760
Major languages: Tokelauan, English
Time zones: GMT - 11h

Telecommunications Statistics

Number of telephones: NA
 Submarine cable connections: NA
 Radio stations: NA
 Television standard: none
 Electrical standard: NA
 State-run television networks: none
 Private television networks: none
 Television stations: none
 Television sets: NA
 TV households: NA
 Cable penetration: NA
 VCR penetration: NA
 Satellite Earth stations: none

Telecommunications Regulatory Organization

Secretary for Tolelau Affairs
 P.O. Box 865
 Apia, Tokelau
 Telephone: +20822

Range of Geostationary Satellites Visible

Location Tokelau
 Lat.° 9S
 Long.° 171.7E
 °Long. Differ. Visible 76°
 Eastern Limit for GSO 248°E
 Western Limit for GSO 96°E

■ **TONGA**

Official name: Kingdom of Tonga
 Capital: Nuku'alofa
 ITU country abbreviation: TON
 ITU Region: 3

International telephone dialing code: NA
 International telex dialing code: NA

Demographic and Physical Information

Area: 748 km²
 Population: 103,114
 Major languages: Tongan, English
 Time zones: GMT +12h

Telecommunications Statistics

Number of telephones: 3,529
 Submarine cable connections: NA
 Radio stations: 1 AM
 Television standard: none
 Electrical standard: 240 vac, 50 Hz
 State-run television networks: none
 Private television networks: none
 Television stations: none
 Television sets: none
 TV households: none
 Cable penetration: none
 VCR penetration: none
 Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Tonga Telecommunication Commission (TTC)
 P.O. Box 46
 Nuku' Alofa, Tonga
 Telephone: +676 24255
 Fax: +676 22200

Officials

Lemeki Malu, General Manager, TTC

Broadcasting Services

Tonga Broadcasting Commission
 P.O. Box 36
 Nuku' Alofa, Tonga
 Telephone: +676 21555

Other Recognized Operators

Cable and Wireless Plc.
 Private Mail Bag No. 4
 Nuku' Alofa, Tonga
 Telephone: +676 23499
 Fax: +676 22970
 Telex: 0777 66222

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

Range of Geostationary Satellites Visible

Location Nuku'alofa
 Lat.° 21.2S
 Long.° 174E
 °Long. Differ. Visible 76°
 Eastern Limit for GSO 250°E
 Western Limit for GSO 98°E

■ **VIETNAM**

Official name: Socialist Republic of Vietnam
 Capital: Hanoi
 ITU country abbreviation: VTN
 ITU Region: 3

International telephone dialing code: 84
 International telex dialing code: 798

Demographic and Physical Information

Area: 329,560 km²
 Population: 68.96 million
 Major languages: Vietnamese (official); French, Chinese
 Time zones: GMT + 7h

Telecommunications Statistics

Number of telephones: 172,000
 Submarine cable connections: NA
 Radio stations: 16 AM, 1 FM
 Television standard: VHF: SECAM D; UHF: SECAM K

Electrical standard: 120, 127, and 220 vac, 50 Hz
 State-run television networks: 1
 Private television networks: none
 Television stations: 2
 Television sets: 3 million
 TV households: NA
 Cable penetration: NA
 VCR penetration: NA
 Satellite Earth stations: NA

Telecommunications Regulatory Organization

Ministry of Transport and Communications
 80 Tran Hung Dao Street, Hanoi 10 000, Vietnam
 +84 4 52079

Officials

Bui Danh Luu, Minister of Transport and Communications; Le Kha, Vice-Minister, Posts and Telecommunications; Le Due Niem, Director, Posts and Telecommunications; Pham Van Danh, Director, International Relations

Broadcasting Services

Central TV Studios of Vietnam
 85 Kuan Su
 Hanoi, Vietnam
 Telephone: +84 51434/5

International Telecommunications Organization Membership

International Organization of Space Communications (Intersputnik)

International Telecommunication Union (ITU)

International Telecommunications Satellite Organization (Intelsat)
 Signatory: Direction Generale des Postes et Telecommunications de la Republique Socialiste du Viet Nam
 Ownership: 0.050000%
 Earth stations: NA

Range of Geostationary Satellites Visible

Location Hanoi
 Lat.° 21.1N
 Long.° 105.9E
 °Long. Differ. Visible 76°
 Eastern Limit for GSO 181°E
 Western Limit for GSO 30°E

■ **WESTERN SAMOA**

Official name: Independent State of Western Samoa
 Capital: Apia
 ITU country abbreviation: SMO
 ITU Region: 3

International telephone dialing code: 685
 International telex dialing code: NA

Demographic and Physical Information

Area: 2,860 km²
 Population: 194,992
 Major languages: Samoan, English
 Time zones: GMT - 11h

Telecommunications Statistics

Number of telephones: 7,500
 Submarine cable connections: NA
 Radio stations: 1 AM
 Television standard: none
 Electrical standard: 230 vac, 50 Hz
 State-run television networks: none

Private television networks: none
 Television stations: none
 Television sets: none
 TV households: none
 Cable penetration: none
 VCR penetration: none
 Satellite Earth stations: 1 Intelsat POR

Telecommunications Regulatory Organization

Posts and Telecommunications Department
 General Post Office
 Apia, Western Samoa
 Telephone: +685 24671
 Fax: (G2/3) +685 24000

Officials

S.R. Petaia, Director, Posts and Telecommunications

International Telecommunications Organization Membership

International Telecommunication Union (ITU)

Range of Geostationary Satellites Visible

Location Apia
 Lat.° 13.8S
 Long.° 171.7W
 ° Long. Differ. Visible 76°
 Eastern Limit for GSO 248°E
 Western Limit for GSO 96°E
 Telex: +948(or 956) 25 0216

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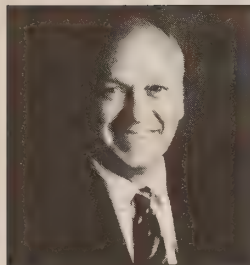
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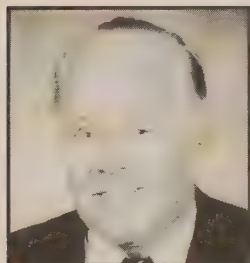
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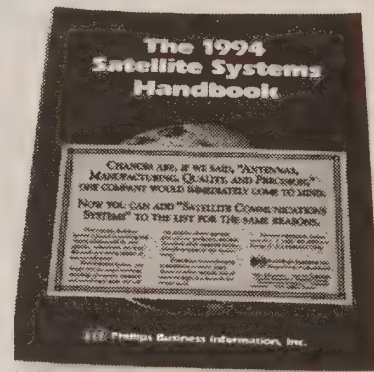
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Section VII: International, Intergovernmental and Regional Telecommunications Policy and Regulatory Organizations

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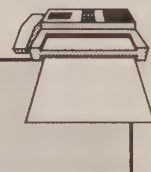
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SECTION 9

PRODUCT/SERVICE YELLOW PAGES

Included in This Section:

This section provides a quick reference to those who are looking for suppliers of specific products or services. A typical entry contains the following:

1. Company name;
2. City and state or province;
3. Country;
4. Telephone number.

How to Use This Section:

Entries are listed alphabetically under each category heading. To find a particular product or service, refer to the Product/Service Index on the next page. Complete company information for the companies contained in this section can be found by referencing the Company Index.

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New Delhi, INDIA; 462-2963
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Technology Company Ltd.
Beijing, CHINA; (1)256-2573
Daeyoung Electronics Industries Company Ltd.
Yongsan-ku, Seoul, KOREA; (02)790-6873
Dura-Line Corporation
Minato-ku, Tokyo JAPAN; (03)3588-9810
Hanjin Electronics Company
Seoul, KOREA; (02)552-7511
Jerrold Communications
Singapore, SINGAPORE; 322-8552
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

Koil Corporation
Seoul, KOREA; (02)271-0030
M/S U.M.S. Factory (P.) Ltd.
Colmbatore, INDIA; 422-213377
Pacific Satellite International Ltd.
Chai Wan, HONG KONG; 898-1909
Pan Asian Systems Ltd.
Wong Chuk Hang, HONG KONG; 873-9777
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Skywaves
Bombay, INDIA; 407-5960
Transcom
Pune, INDIA; 432-438; 432-488
Tricom Company Ltd.
Seoul, KOREA; (02)701-7084
Tunewell Electronics Pvt. Ltd.
Bombay, INDIA; 22-627-0416
Vict International Corporation
Taipei, TAIWAN; (2)8161926
Videoshack Systems Ltd.
Rawalpindi, PAKISTAN; 51-861-955
Yagi Antenna
Tokyo, JAPAN; (03)3292-7524

CHANNEL SELECTORS

Anu Enterprises
New Delhi, INDIA; 462-2963
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

COMBINERS

Allgon AB
Singapore, SINGAPORE; 336-6577
Allied Communications
New Delhi, INDIA; 11-683-9615; 636-208
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Silicon Valley Corporation
Madras, INDIA; 44-8259983

COMMISSIONING

Asia Pacific Satellite Consultants Inc.
Jakarta, INDONESIA; 21-310-650/2601
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

COMPRESSION SYSTEMS

Salim Mehmud
Sindh, PAKISTAN; (21)442 068

CONSTRUCTION

GTE Hawaiian Tel
Honolulu, HI USA; (808)643-1000
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Ohbayashi Corporation
Tokyo, JAPAN; (03)292-1111
Telecom Corporation of New Zealand
Wellington, NEW ZEALAND; (4)382-3333

CONSULTING

Andersen Consulting
Melbourne, VIC AUSTRALIA; (3)286-7908
Asia Pacific Satellite Consultants Inc.
Jakarta, INDONESIA; 21-310-650/2601
Austernetics Pty. Ltd.
Manly, NSW AUSTRALIA; (2)977-1194
Datacraft
Hong Kong, HONG KONG; 807-2313
Echbee Techno Legal Aid Centre
Bombay, INDIA; 204-3489
Electronics and Telecommunications Research
Institute (ETRI)
Daejeon, KOREA; (42)860-6849
Infra Telecom Asia Ltd.
Hong Kong, HONG KONG; 806-6688
Jung Ang Electronics Company
Seoul, KOREA; (02)279-6417
M/S Viva International
Lahore, PAKISTAN; 42-723-6311
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Midland Asia Ltd. Land Mobile Radio
Hong Kong, HONG KONG; 761-3828
Mitsubishi Cable Industries Ltd.
Tokyo, JAPAN
Radio Research Laboratory
Seoul, KOREA; (02)750-2352
Silicon Valley Corporation
Madras, INDIA; 44-8259983
Sky Sat Ltd.
Bangkok, THAILAND; (2)381-8054
Telsat Communications Ltd.
Palmerston North, NEW ZEALAND
United Satellite and Radio Systems
Metro Manila, PHILIPPINES; (2)831-2676

CONSULTING, TECHNICAL

Asia Pacific Satellite Consultants Inc.
Jakarta, INDONESIA; 21-310-650/2601
C.E.B.I.
Metro Manila, PHILIPPINES; (2)532-7283
City Channels
Coimbatore, INDIA; 422-852-342
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341

HiTron Pty. Ltd.
Hohola, N.C.D., PAPUA NEW GUINEA;
25-2311
Kalyani Mercantile Company
Nasik, INDIA; 253-70089
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

CONTROL EQUIPMENT

AWA Defense Ltd.
North Ryde, NSW AUSTRALIA; (2)887-7711
Ishikawajima — Harima Heavy Industries
Company Ltd.
Tokyo, JAPAN; (33)3286-2553
Ishikawajima-Harima Heavy Industries
Company Ltd.
Chiyodaku, Tokyo JAPAN; (03)3244-5333
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Larson & Toubro — Powai Works
Bombay, INDIA; 22-261-8181
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Satellite Communication Company — Chinese
Academy of Sciences
Beijing, CHINA; (1)256-1262
Tele-Dynamic Pte. Ltd.
Singapore, SINGAPORE
Westronic Australia Ltd.
Welshpool, AUSTRALIA; (9)470-2088

CONTROLLERS, NETWORK

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

CONVERSION PRODUCTS/ SYSTEMS

Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Larson & Toubro — Powai Works
Bombay, INDIA; 22-261-8181

CONVERTERS

Daeyoung Electronics Industries Company
Ltd.
Yongsan-ku, Seoul, KOREA; (02)790-6873
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606 UMS Radio
Factory Private Ltd.
Tamil Nadu, INDIA; 042-221-3377
Wellbe Company Ltd.
Wanchai, HONG KONG; 839-2181

DATA COLLECTION SYSTEMS

Data Systems Sales (DSS)
Honolulu, HI USA; (800)292-4377
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

DATA COMMUNICATION PRODUCTS

AT&T Paradyne Far East
Hong Kong, HONG KONG; 543-0083
Data Communications Company
Seoul, KOREA; (02)220-6750
Datacraft
Hong Kong, HONG KONG; 807-2313
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Datacraft (Thailand) Ltd.
Bangkok, THAILAND; (2)611-2914
E-TECH Inc.
Hsinchu, TAIWAN; (35)774991
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
O'Connor's Engineering and Trading
(Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599
Radac Pty. Ltd.
Singapore, SINGAPORE; 443-8277
Satelink Ltd.
Wellington, NEW ZEALAND; (4)384-9482
Signals Corporation
Petaling Jaya, MALAYSIA; (03)755-6948

DATA TERMINALS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

DECODERS

Av-Comm Pty Ltd.
Balgowlah, AUSTRALIA; (2)949-7417

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Pace Micro Technology
Central Hong Kong, HONG KONG; 841-7809
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Silicon Valley Corporation
Madras, INDIA; 44-8259983

DEMODULATORS

Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

DESIGN SERVICES

AWA Defense Ltd.
North Ryde, NSW AUSTRALIA;
(2)887-7711
Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Hawker De Havilland Ltd.
Bankstown, NSW AUSTRALIA; (2)772-8111
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Nissan Aerospace Engineering Company Ltd.
Tokyo, JAPAN; (03)3301-6740

DETECTORS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

DIGITAL AUDIO BROADCASTING EQUIPMENT

Advantest Corporation
Singapore, SINGAPORE; 299-4268
Alcatel Australia Ltd
Alexandria, AUSTRALIA; (2)699-0044

DIPLEXERS

CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

DISPLAY SYSTEMS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

DOWNCONVERTERS

Gardiner Communications Corporation
Kwai Chung, N.T., HONG KONG; 420-7081
Koil Corporation
Seoul, KOREA; (02)271-0030
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Silicon Valley Corporation
Madras, INDIA; 44-8259983

DOWNLINKING

Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Hong Kong Telecom Private Network Service
Management
HONG KONG; 883-3146
Japan Business Television Inc.
Tokyo, JAPAN; (03)470-3080

EARTH STATION EQUIPMENT

Anritsu Corporation
Tokyo, JAPAN; (03)3446-1111
Codan Pty. Ltd.
Dee Why, NSW AUSTRALIA; (2)971-2233
Kanto Aircraft Instrument Company Ltd.
Kanagawa-ken, JAPAN; (466)813311
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
Radac Pty. Ltd.
Singapore, SINGAPORE; 443-8277
Satelink Ltd.
Wellington, NEW ZEALAND; (4)384-9482
Toshiba Corporation
Minato-ku, Tokyo JAPAN; (03)457-3077

EARTH STATIONS

Anritsu Corporation
Tokyo, JAPAN; (03)3446-1111

AWA Defense Ltd.
North Ryde, NSW AUSTRALIA;
(2)887-7711
Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
British Aerospace Australia Ltd.
Salisbury, SA AUSTRALIA; (8)343-8211
Codan Pty. Ltd.
Dee Why, NSW AUSTRALIA; (2)971-2233
CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222
Furuno Electric Company Ltd.
Nishinomiya, JAPAN; (0798)65-2111
GoldStar Information and Communications
Ltd.
Kungki-Do, KOREA; (343)50-7246
Hitachi Ltd.
Tokyo, JAPAN; (03)3258-1111
Japan Radio Company Ltd.
Tokyo, JAPAN; (03)3584-8836
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Koil Corporation
Seoul, KOREA; (02)271-0030
LeBlanc Communications Inc.
Aiea, HI USA; (808)488-2436
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Samart Corporation Public Company Ltd.
Pathumthanee, THAILAND; (2)516-1188
Scientific-Atlanta Inc.
Singapore, SINGAPORE; 733-4314
Silicon Valley Corporation
Madras, INDIA; 44-8259983
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779
Wellbe Company Ltd.
Wanchai, HONG KONG; 839-2181

ENCODERS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Philips Singapore
Singapore, SINGAPORE; 258-6801

ENCRYPTION SYSTEMS

Datacraft (Thailand) Ltd.
Bangkok, THAILAND; (2)611-2914
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

ENGINEERING SERVICES

Alslys K.K.E. Company Ltd.
Yokohama, JAPAN; (04)5451-2412

Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322

Hind High Vacuum Company Ltd.
Peenya, Bangalore INDIA; 80-394615

Infra Telecom Asia Ltd.
Hong Kong, HONG KONG; 806-6688

Ishikawajima — Harima Heavy Industries Company Ltd.
Tokyo, JAPAN; (33)3286-2553

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

LeBlanc Communications Inc.
Aiea, HI USA; (808)488-2436

Salim Mehmud
Sindh, PAKISTAN; (21)442 068

Mitsubishi Cable Industries Ltd.
Tokyo, JAPAN

Mitsubishi Space Software Company Ltd.
Tokyo, JAPAN; (03)435-4726

Mobile Telesystems Inc.
Hsinchu, TAIWAN; (3)577-2580

Nissan Aerospace Engineering Company Ltd.
Tokyo, JAPAN; (03)3301-6740

O'Connor's Engineering and Trading (Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599

Pan Asian Systems Ltd.
Wong Chuk Hang, HONG KONG; 873-9777

Philips Singapore
Singapore, SINGAPORE; 258-6801

Skydata Inc. — A Division of the Samsung Company
Seoul, KOREA; (02)751-2544-6

Superior Communications
Kuala Lumpur, MALAYSIA; (03)242-8151

Tektronix Inc.
Hong Kong, HONG KONG; 598-6260

Tele-Dynamic Pte. Ltd.
Singapore, SINGAPORE

EQUALIZERS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

FEED HORNS

Al Tai Sat
Baghdad, IRAQ; 1-541-1277

Antech Development Ltd.
Chai Wan, HONG KONG; 515-0191

Anu Enterprises
New Delhi, INDIA; 462-2963

Av-Comm Pty Ltd.
Balgowlah, AUSTRALIA; (2)949-7417

Beijing Asia Satellite Communications Technology Company Ltd.
Beijing, CHINA; (1)256-2573

CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222

Dixit Associates
Calcutta, INDIA; 33-724-895; 266-936

Gardiner Communications Corporation
Kwai Chung, N.T., HONG KONG; 420-7081

Humphery International Company Ltd.
Taipei, TAIWAN; (2)882-1257-9

Hwang Piin Industrial Company Ltd.
Lu-Jou Hsiang, Taipei TAIWAN; (2)281-6636

Lanna Supply Company Ltd.
Chiang Mai, THAILAND; (53)212-727

Lotus Cine Pvt Ltd.
New Delhi, INDIA; 11-462-4983

M/S U.M.S. Factory (P.) Ltd.
Colmbatore, INDIA; 422-213377

M/S Viva International
Lahore, PAKISTAN; 42-723-6311

Micro Vision
Colombo 11, SRI LANKA; 446519

Modern Communications and Broadcast Systems Pvt. Ltd.
Ahmedabad, INDIA; 401821

Nyron Communications Inc.
Taipei, TAIWAN; (2)882-1257

Satellite Television Systems Pte. Ltd.
Singapore, SINGAPORE

Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

Skawol Ltd. — Hong Kong
Kowloon, HONG KONG; 351-6381

Star Vision
Tamil Nadu, INDIA; 422-48373

Tee-Com Electronics
Singapore, SINGAPORE; 227-7335

Tele-Com Electronics
SINGAPORE; 227-7335

Thai Network Center Company Ltd.
Bangkok, THAILAND; (2)282-5286

UMS Radio Factory Private Ltd.
Tamil Nadu, INDIA; 042-221-3377

Videoshack Systems Ltd.
Rawalpindi, PAKISTAN; 51-861-955

Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

FEED SYSTEMS

Anu Enterprises
New Delhi, INDIA; 462-2963

CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222

Pacific Satellite International Ltd.
Chai Wan, HONG KONG; 898-1909

Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

Silicon Valley Corporation
Madras, INDIA; 44-8259983

FETS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

FILTER BANKS

Anu Enterprises
New Delhi, INDIA; 462-2963

FILTERS

Anu Enterprises
New Delhi, INDIA; 462-2963<

CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

Salim Mehmud
Sindh, PAKISTAN; (21)442 068

Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

Silicon Valley Corporation
Madras, INDIA; 44-8259983

Silicon Valley Corporation
Madras, INDIA; 44-8259983

Toyo Communication Equipment Company Ltd.
Tokyo, JAPAN; (03)3459-7320

FINANCIAL SERVICES

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341

FREQUENCY COUNTERS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341

Salim Mehmud
Sindh, PAKISTAN; (21)442 068

GENERATORS, SIGNAL

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

HUB SERVICES

PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399

INSTALLATION AND MAINTENANCE

Anu Enterprises
New Delhi, INDIA; 462-2963
Asia Pacific Satellite Consultants Inc.
Jakarta, INDONESIA; 21-310-650/2601
Azimuth (Far East) Ltd.
Beijing, CHINA; (1)436-1898
Beijing Asia Satellite Communications
Technology Company Ltd.
Beijing, CHINA; (1)256-2573
Datacraft
Hong Kong, HONG KONG; 807-2313
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Philips Singapore
Singapore, SINGAPORE; 258-6801
Radio Frequency Systems
Kilsyth, VIC AUSTRALIA; (3)728-1777
Siemens Ltd.
Richmond, VIC AUSTRALIA; (3)420-7111
Skydata Inc. — A Division of the Samsung
Company
Seoul, KOREA; (02)751-2544-6
Tektronix Inc.
Hong Kong, HONG KONG; 598-6260
Tele-Dynamic Pte. Ltd.
Singapore, SINGAPORE
Telecom Corporation of New Zealand
Wellington, NEW ZEALAND; (4)382-3333

INSURANCE

GIO Reinsurance
Sydney, NSW AUSTRALIA; (2)228-1327
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
The Yasuda Fire and Marine Insurance
Company Ltd.
Tokyo, JAPAN; (03)3349-4032

INTERCONNECTION, INTERNATIONAL

Japan Business Television Inc.
Tokyo, JAPAN; (03)470-3080

LAUNCH SERVICES

Arianespace — Asia Pacific Office
Tokyo, JAPAN; (03)3592-2766

China Great Wall Industry Corporation
Beijing, CHINA; (1)837-2942; (1)837-2707
NASDA — The National Space Development
Agency of Japan
Tokyo, JAPAN; (03)547-04111
Shimizu Corporation
Tokyo, JAPAN; (03)5441-1111
Space Engineering Development Company
Ltd.
Tokyo, JAPAN; (03)319-4001
Telecommunications Advancement
Organization of Japan
Tokyo, JAPAN; (03)769-6811

LAUNCH VEHICLES

Arianespace — Asia Pacific Office
Tokyo, JAPAN; (03)3592-2766
China Great Wall Industry Corporation
Beijing, CHINA; (1)837-2942; (1)837-2707
Hindustan Aeronautics Ltd.
Bangalore, INDIA; 812-266901/6
Mitsubishi Heavy Industries Ltd.
Tokyo, JAPAN; (03)3212-3111
NASDA — The National Space Development
Agency of Japan
Tokyo, JAPAN; (03)547-04111
Nissan Motor Company Ltd.
Tokyo, JAPAN; (03)3543-5523
Nissan Motor Company Ltd. — Aerospace
Division
Tokyo, JAPAN; (03)3301-6610

LEGAL SERVICES

Anu Enterprises
New Delhi, INDIA; 462-2963
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Echbee Techno Legal Aid Centre
Bombay, INDIA; 204-3489

LICENSE PROCUREMENT AND SERVICES

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341

MICROWAVE EQUIPMENT

Anu Enterprises
New Delhi, INDIA; 462-2963
Awa Communications
Sydney, AUSTRALIA; (2)413-6333

Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222
Daeyoung Electronics Industries Company
Ltd.
Yongsan-ku, Seoul, KOREA; (02)790-6873
Delta Electronics Inc.
Kuala Lumpur, MALAYSIA; (03)233-6107
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Japan Radio Company Ltd.
Tokyo, JAPAN; (03)3584-8836
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
LeBlanc Communications Inc.
Aiea, HI USA; (808)488-2436
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Westronic Australia Ltd.
Welshpool, AUSTRALIA; (9)470-2088

MILITARY PRODUCTS & SYSTEMS

Anu Enterprises
New Delhi, INDIA; 462-2963
Daeyoung Electronics Industries Company
Ltd.
Yongsan-ku, Seoul, KOREA; (02)790-6873
Hitachi Zosen Corporation
Tokyo, JAPAN; (03)3217-8418
Japan Radio Company Ltd.
Tokyo, JAPAN; (03)3584-8836
S. Megga Telecommunications
Kwai Chung, N.T., HONG KONG; 614-1111
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

MIXERS

M/S U.M.S. Factory (P.) Ltd.
Colmbatore, INDIA; 422-213377

MODEMS, MULTI-RATE

Daeyoung Electronics Industries Company
Ltd.
Yongsan-ku, Seoul, KOREA; (02)790-6873
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
E-TECH Inc.
Hsinchu, TAIWAN; (35)774991
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001

MODEMS, SCPC

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Radac Pty.Ltd.
Singapore, SINGAPORE; 443-8277

MODEMS, SIGNAL

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

MODEMS, VOICE CHANNEL

E-TECH Inc.
Hsinchu, TAIWAN; (35)774991
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

MODULATORS

Allied Communications
New Delhi, INDIA; 11-683-9615; 636-208
Anu Enterprises
New Delhi, INDIA; 462-2963
Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Innovative Technologies
Piliyandala, SRILANKA
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
N.G. Electronics
New Delhi, INDIA; 11-681-1625
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Star Vision
Tamil Nadu, INDIA; 422-48373

MODULATORS, RF

Anu Enterprises
New Delhi, INDIA; 462-2963
Nagare Electronics
Nasik, INDIA; 253-71206
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Silicon Valley Corporation
Madras, INDIA; 44-8259983

MONITORING EQUIPMENT

AWA Defense Ltd.
North Ryde, NSW AUSTRALIA;
(2)887-7711
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
Tektronix Inc.
Hong Kong, HONG KONG; 598-6260
Tele-Dynamic Pte. Ltd.
Singapore, SINGAPORE
Westronic Australia Ltd.
Welshpool, AUSTRALIA; (9)470-2088

MONITORS

Hanjin Electronics Company
Seoul, KOREA; (02)552-7511
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

MOTORS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

MOUNTS

Anu Enterprises
New Delhi, INDIA; 462-2963
Jaeger Industrial Company
Taipei, TAIWAN; (2)913-3422
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
M/S U.M.S. Factory (P.) Ltd.
Colombatore, INDIA; 422-213377
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Silicon Valley Corporation
Madras, INDIA; 44-8259983
Taiwan Microwave Communication Company Ltd.
Hsinchu, TAIWAN; (35)781-380
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

MULTIPLEXERS, FREQUENCY DIVISION

Awa Communications
Sydney, AUSTRALIA; (2)413-6333

Toyo Communication Equipment Company Ltd.

Tokyo, JAPAN; (03)3459-7320

MULTIPLEXERS, STATISTICAL

Anu Enterprises
New Delhi, INDIA; 462-2963
Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Datacraft (Thailand) Ltd.
Bangkok, THAILAND; (2)611-2914
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
O'Connor's Engineering and Trading (Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

MULTIPLEXERS, T-1

Anu Enterprises
New Delhi, INDIA; 462-2963
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155

MULTIPLEXERS, TIME DIVISION

Anu Enterprises
New Delhi, INDIA; 462-2963
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Datacraft (Thailand) Ltd.
Bangkok, THAILAND; (2)611-2914
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
O'Connor's Engineering and Trading (Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Toyo Communication Equipment Company Ltd.
Tokyo, JAPAN; (03)3459-7320

MULTIPLEXERS, WIDEBAND

Anu Enterprises
New Delhi, INDIA; 462-2963

Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

NAVIGATION SYSTEMS

AT&T Asia Pacific Inc.
Hong Kong, HONG KONG; 846-2888
Auspace Ltd.
Mitchell, ACT AUSTRALIA; (6)242-2611
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Philips Singapore
Singapore, SINGAPORE; 258-6801

NAVIGATION SYSTEMS, MARITIME

Hitachi Zosen Corporation
Tokyo, JAPAN; (03)3217-8418
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

NETWORK DESIGN

Datacraft
Hong Kong, HONG KONG; 807-2313
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Hughes Network Systems
Taipei, TAIWAN; (2)514-7122
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399

NETWORK MANAGEMENT SERVICES

Advantest Corporation
Singapore, SINGAPORE; 299-4268
AT&T Paradyne Far East
Hong Kong, HONG KONG; 543-0083
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Telecom Corporation of New Zealand
Wellington, NEW ZEALAND; (4)382-3333

NETWORK MANAGEMENT SYSTEMS

AT&T Asia Pacific Inc.
Hong Kong, HONG KONG; 846-2888
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Datacraft (Thailand) Ltd.
Bangkok, THAILAND; (2)611-2914
Hutchison Telecommunications Ltd.
Hong Kong, HONG KONG; 828-3222
O'Connor's Engineering and Trading
(Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599
Philips Singapore
Singapore, SINGAPORE; 258-6801

NETWORKING, VSAT

Globe Telecom
Ermita Manila, PHILIPPINES; (2)521-3550
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399

NEWS FEEDS

Asiavision Ltd.
Hong Kong, HONG KONG; 525-5751
Space Association of Australia
Mulgrave North, VIC AUSTRALIA;
(3)772-5804

OEM SYSTEMS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

OSCILLATORS, ATOMIC

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

PAYLOAD ASSISTANCE

Salim Mehmod
Sindh, PAKISTAN; (21)442 068

PAYLOADS

Salim Mehmod
Sindh, PAKISTAN; (21)442 068

PCM SYSTEMS

Salim Mehmod
Sindh, PAKISTAN; (21)442 068
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Toyo Communication Equipment Company
Ltd.
Tokyo, JAPAN; (03)3459-7320

POLARIZERS

Anu Enterprises
New Delhi, INDIA; 462-2963
Humphery International Company Ltd.
Taipei, TAIWAN; (2)882-1257-9
Nyron Communications Inc.
Taipei, TAIWAN; (2)882-1257
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606

POSITIONERS

Anu Enterprises
New Delhi, INDIA; 462-2963
Jaeger Industrial Company
Taipei, TAIWAN; (2)913-3422
Shyam Antenna Electronic Pvt. Ltd.
New Delhi, INDIA; 11-543-9606
Silicon Valley Corporation
Madras, INDIA; 44-8259983
Telemax Company Ltd.
Seoul, KOREA; (02)651-8112
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

POWER SUPPLIES

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
E-HWA Electrical Industries Company Ltd.
Seoul, KOREA; (02)414-8111
Fil Products Inc.
Cebu City, PHILIPPINES; (2)632-9037
Han Young Electrical Company Ltd.
Seoul, KOREA; (02)463-6141
Hitachi Zosen Corporation
Tokyo, JAPAN; (03)3217-8418
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmod
Sindh, PAKISTAN; (21)442 068

PROCESSORS, AUDIO

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

PROCESSORS, BASEBAND

Alcatel Australia Ltd
Alexandria, AUSTRALIA; (2)699-0044
Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322

PROGRAM EQUIPMENT, AUTOMATIC

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

PROJECT DEVELOPMENT

Hitachi Zosen Corporation
Tokyo, JAPAN; (03)3217-8418

PROJECT MANAGEMENT

Asia Pacific Satellite Consultants Inc.
Jakarta, INDONESIA; 21-310-650/2601
Datacraft
Hong Kong, HONG KONG; 807-2313
Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Datacraft (Thailand) Ltd.
Bangkok, THAILAND; (2)611-2914

PROPULSION SYSTEMS

Hitachi Zosen Corporation
Tokyo, JAPAN; (03)3217-8418
Ishikawajima-Harima Heavy Industries
Company Ltd.
Chiyodaku, Tokyo JAPAN; (03)3244-5333
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

PUBLICATIONS

Cable & Satellite TV Guide
Taipei, TAIWAN; (2)778-5818
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Pacific Telecommunications Council
Honolulu, HI USA; (808)941-3789

Pyramid Research Inc.
SINGAPORE; 283-6672
Space Association of Australia
Mulgrave North, VIC AUSTRALIA;
(3)772-5804

RECEIVE-ONLY SYSTEMS

Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Pacific Satellite International Ltd.
Chai Wan, HONG KONG; 898-1909
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399
Silicon Valley Corporation
Madras, INDIA; 44-8259983
UMS Radio Factory Private Ltd.
Tamil Nadu, INDIA; 042-221-3377

RECEIVERS

Beijing Asia Satellite Communications
Technology Company Ltd.
Beijing, CHINA; (1)256-2573
Furuno Electric Company Ltd.
Nishinomiya, JAPAN; (0798)65-2111
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Silicon Valley Corporation
Madras, INDIA; 44-8259983
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

RECRUITMENT/ PERSONNEL SERVICES

Anu Enterprises
New Delhi, INDIA; 462-2963
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

REFLECTORS, ANTENNA

Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Silicon Valley Corporation
Madras, INDIA; 44-8259983

RELAYS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

REMOTE SENSING IMAGERY

Australian Centre for Remote Sensing
Bruce, ACT AUSTRALIA; (6)252-4411
British Aerospace Australia Ltd.
Salisbury, SA AUSTRALIA; (8)343-8211
Dynascan Inspection Systems
Bangalore, INDIA; 576-129
Indian Space Research Organization
Bangalore, INDIA; 812-334474
Isro Satellite Center
Bangalore, INDIA; 38261
Necom Pte. Ltd.
Singapore, SINGAPORE; 732-2001
SPOT Imaging Services
St. Leonards, NSW AUSTRALIA;
(2)906-1733

REPAIR SERVICES

Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Schmidt & Company Ltd.
Hong Kong, HONG KONG; 507-0222

RESEARCH AND DEVELOPMENT

Astratech Communications
Canberra, ACT AUSTRALIA; (6)241-6019
Auspace Ltd.
Mitchell, ACT AUSTRALIA; (6)242-2611
Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222
Fuji Heavy Industries Ltd.
Tokyo, JAPAN; (03)3347-2588
High Technology Development Corporation
Mililani, HI USA; (808)625-5293
Hitachi Zosen Corporation
Tokyo, JAPAN; (03)3217-8418
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
National Space Council
Taipei, TAIWAN

Pyramid Research Inc.
SINGAPORE; 283-6672
Radio Frequency Systems
Kilsyth, VIC AUSTRALIA; (3)728-1777
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

RF EQUIPMENT

Daeyoung Electronics Industries Company Ltd.
Yongsan-ku, Seoul, KOREA; (02)790-6873
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

ROCKET ENGINES

Ishikawajima — Harima Heavy Industries Company Ltd.
Tokyo, JAPAN; (33)3286-2553
Ishikawajima-Harima Heavy Industries Company Ltd.
Chiyodaku, Tokyo JAPAN; (03)3244-5333
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Komatsu Zenoah Company
Tokyo, JAPAN; (425)651971
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Nissan Motor Company Ltd.
Tokyo, JAPAN; (03)3543-5523
Nissan Motor Company Ltd. — Aerospace Division
Tokyo, JAPAN; (03)3301-6610

SATELLITE SPACECRAFT COMPONENTS

Cad Cam Industries
Central District, HONG KONG; 524-2483
China Great Wall Industry Corporation
Beijing, CHINA; (1)837-2942; (1)837-2707
Comstream Corporation
Hong Kong, HONG KONG; 559-6907
CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222
Hutchison Telecommunications Ltd.
Hong Kong, HONG KONG; 828-3222
Indian Space Research Organization
Bangalore, INDIA; 812-334474
Japan Aircraft Manufacturing Company Ltd.
Yokohama, JAPAN; (04)5773-5111
Marubeni Corporation
Tokyo, JAPAN; (03)3282-9611

Nippon Oil and Fats Company Ltd.
Tokyo, JAPAN; (03)3283-7089
Toshiba Corporation
Minato-ku, Tokyo JAPAN; (03)457-3077

SATELLITE WEATHER SYSTEMS/EQUIPMENT

Cad Cam Industries
Central District, HONG KONG; 524-2483

SCPC EQUIPMENT

Bharat Electronics Ltd.
Bangalore, INDIA; 812-269-897;
812-267-322
Industronics SDN BHD
Kuala Lumpur, MALAYSIA; (03)756-0255
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

SCRAMBLING EQUIPMENT/SYSTEMS

Salim Mehmud
Sindh, PAKISTAN; (21)442 068

SENSORS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

SHELTERS

Siemens Ltd.
Richmond, VIC AUSTRALIA; (3)420-7111

SIMULATION SERVICES

Tricom Company Ltd.
Seoul, KOREA; (02)701-7084

SITE MANAGEMENT

Salim Mehmud
Sindh, PAKISTAN; (21)442 068

SITE SURVEYS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

SOFTWARE DEVELOPMENT

Alslys K.K.E. Company Ltd.
Yokohama, JAPAN; (04)5451-2412
INFOCOMM International Corporation
Taibet, TAIWAN; (2)719-2668
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Mitsubishi Space Software Company Ltd.
Tokyo, JAPAN; (03)435-4726
Toshiba Corporation
Minato-ku, Tokyo JAPAN; (03)457-3077
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

SOFTWARE

Alslys K.K.E. Company Ltd.
Yokohama, JAPAN; (04)5451-2412
INFOCOMM International Corporation
Taibet, TAIWAN; (2)719-2668
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Satelink Ltd.
Wellington, NEW ZEALAND; (4)384-9482
Wavetech Ltd.
Karachi, PAKISTAN; (21)447 779

SPACE SEGMENT COORDINATION

Alcatel Radio Space & Defense
Singapore, SINGAPORE; 475-1266

SPECTRUM ANALYZERS

Advantest Corporation
Singapore, SINGAPORE; 299-4268
Advantest Corporation
Singapore, SINGAPORE; 299-4268
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

SPLITTERS, PASSIVE

CSIRO Division of Radiophysics
Epping, NSW AUSTRALIA; (2)372-4222

Fil Products Inc.
Cebu City, PHILIPPINES; (2)632-9037
Lotus Cine Pvt Ltd.
New Delhi, INDIA; 11-462-4983
N.G. Electronics
New Delhi, INDIA; 11-681-1625

SUBSYSTEMS

Hyunkwang Electronics and
Telecommunications Inc.
Seoul, KOREA; (02)908-0861

SURGE PROTECTION SYSTEMS

American Power Conversion
Singapore, SINGAPORE; 474-0789
Critec Pty Ltd
Hobart, AUSTRALIA; (2)730-066
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

SURGE PROTECTORS

American Power Conversion
Singapore, SINGAPORE; 474-0789
Critec Pty Ltd
Hobart, AUSTRALIA; (2)730-066

SWITCHES

Datacraft Pte. Ltd. — Singapore
Singapore, SINGAPORE; 280-5155
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Hughes Network Systems
Taipei, TAIWAN; (2)514-7122
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
O'Connor's Engineering and Trading
(Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
Westronic Australia Ltd.
Welshpool, AUSTRALIA; (9)470-2088

SWITCHING SYSTEMS

Ascom Timeplex Far East
Causway Bay, Hong Kong HONG KONG;
830-9889
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

SYNTHESIZERS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Wellbe Company Ltd.
Wanchai, HONG KONG; 839-2181

SYSTEM INTEGRATION SERVICES

GTE Hawaiian Tel
Honolulu, HI USA; (808)643-1000
Samart Corporation Public Company Ltd.
Pathumthanee, THAILAND; (2)516-1188
Superior Communications
Kuala Lumpur, MALAYSIA; (03)242-8151

TECHNICAL SUPPORT

Alslys K.K.E. Company Ltd.
Yokohama, JAPAN; (04)5451-2412
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Telecom Repair Services
Auckland, NEW ZEALAND; (9)274-3367

TERMINALS

Ascom Timeplex Far East
Causway Bay, Hong Kong HONG KONG;
830-9889
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Satelink Ltd.
Wellington, NEW ZEALAND; (4)384-9482
Skydata Inc. — A Division of the Samsung
Company
Seoul, KOREA; (02)751-2544-6

TEST AND MEASUREMENT EQUIPMENT

Al Tai Sat
Baghdad, IRAQ; 1-541-1277
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Hitachi Ltd.
Tokyo, JAPAN; (03)3258-1111
Ishikawajima-Harima Heavy Industries
Company Ltd.
Chiyodaku, Tokyo JAPAN; (03)3244-5333

Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Kawasaki Heavy Industries Ltd.
Minato-ku, Tokyo JAPAN; (03)3435-2131
Larson & Toubro — Powai Works
Bombay, INDIA; 22-261-8181
Salim Mehmud
Sindh, PAKISTAN; (21)442 068
O'Connor's Engineering and Trading
(Malaysia) Bhd.
Petaling Jaya, MALAYSIA; (03)7566599
Shimizu Corporation
Tokyo, JAPAN; (03)5441-1111
Signals Corporation
Petaling Jaya, MALAYSIA; (03)755-6948
Tektronix Inc.
Hong Kong, HONG KONG; 598-6260
Tele-Dynamic Pte. Ltd.
Singapore, SINGAPORE
Telecom Corporation of New Zealand
Wellington, NEW ZEALAND; (4)382-3333
Tricom Company Ltd.
Seoul, KOREA; (02)701-7084

TESTING AND EVALUATION

Adtech Inc.
Honolulu, HI USA; (808)941-0708
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

TIMERS

Karachi Scientific Society
Karachi, PAKISTAN; 714 501

TOOLS

Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Karachi Scientific Society
Karachi, PAKISTAN; 714 501

TRACKING AND CONTROL SERVICES

Beijing Asia Satellite Communications
Technology Company Ltd.
Beijing, CHINA; (1)256-2573
Space Engineering Development Company Ltd.
Tokyo, JAPAN; (03)319-4001

TRACKING AND CONTROL SYSTEMS

Beijing Asia Satellite Communications Technology Company Ltd.
Beijing, CHINA; (1)256-2573
Echbee Corporation
Bombay, INDIA; 204-3489; 204-8341
Hitachi Ltd.
Tokyo, JAPAN; (03)3258-1111
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

TRAINING SERVICES

Alslys K.K.E. Company Ltd.
Yokohama, JAPAN; (04)5451-2412
Datacraft
Hong Kong, HONG KONG; 807-2313
Karachi Scientific Society
Karachi, PAKISTAN; 714 501
Salim Mehmud
Sindh, PAKISTAN; (21)442 068

TRANSMISSION SERVICES

The Communications Authority of Thailand
Bangkok, THAILAND; (2)573-2828
Compunet Corporation Ltd.
Sukhumvit 21 (Bangkok), THAILAND; (2)260-7306
Data Communications of Korea
Seoul, KOREA; (02)796-6200
Eastern Telecoms Telecoms Plaza
Makati (Metro Manila), PHILIPPINES; (2)815-8921
GMCR Inc.
Manilla, PHILIPPINES; (2)521-3550
Hong Kong Telecom International
HONG KONG; (58)291-271
Hong Kong Telecom Private Network Service Management
HONG KONG; 883-3146
International Communications Corporation
Pasig (Metro Manila), PHILIPPINES; (2)631-2447
Japan Communications Satellite Company Inc.
Tokyo, JAPAN; (03)5400-3700
Kokusai Denshin Denwa Company Ltd.
Chiyoda-Ku, Tokyo JAPAN; (33)3240-8420
Korea Telecom Satellite Business Group
Seoul, KOREA; (02)441-4693
Link Communications Taiwan Inc.
TAIWAN; (35)775-175

Macrotel Systems Inc.
Makati (Metro Manila), PHILIPPINES; (2)817-2647
OTC Ltd.
Sydney, NSW AUSTRALIA; (2)287-5000
Philcomsat
Makati (Metro Manila), PHILIPPINES; (2)815-8406
Philippine Global Communications
Makati (Metro Manila), PHILIPPINES; (2)817-0144
Philippines Long Distance Telephone Company
Makati (Metro Manila), PHILIPPINES; (2)815-9605
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399
PT Elektrindo Nusantara — Smartcom Division
Jakarta, INDONESIA; 21-353-197
PT Indosat
Jakarta, INDONESIA; 21-370-166
Q-NET Party Ltd.
Bowen Hills, QLD AUSTRALIA; (7)832-4499
Radac Malaysia Ltd.
Damansara Heights, Kuala Lumpur MALAYSIA; (03)254-3133
Shinawatra Computer and Communications Company Ltd.
Dusit (Bangkok), THAILAND; (2)241-2334
Singapore Telecom
SINGAPORE; 738-5338
Space Association of Australia
Mulgrave North, VIC AUSTRALIA; (3)772-5804
Telekom Malaysia Berhad
Kuala Lumpur, MALAYSIA; (03)232-9494
Telekom Malaysia STM Headquarters
Kuala Lumpur, MALAYSIA; (03)239-2374
Telephone Organization of Thailand
Bangkok, THAILAND; (2)255-0829

TRANSMISSION, AUDIO

Hong Kong Telecom Private Network Service Management
HONG KONG; 883-3146
Japan Communications Satellite Company Inc.
Tokyo, JAPAN; (03)5400-3700
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399
Space Association of Australia
Mulgrave North, VIC AUSTRALIA; (3)772-5804
TRW Overseas Inc.
Tokyo, JAPAN; (03)3234-8892

TRANSMISSION, DATA

The Communications Authority of Thailand
Bangkok, THAILAND; (2)573-2828
Compunet Corporation Ltd.
Sukhumvit 21 (Bangkok), THAILAND; (2)260-7306
Globe Telecom
Ermita Manila, PHILIPPINES; (2)521-3550
Hong Kong Telecom Private Network Service Management
HONG KONG; 883-3146
Japan Communications Satellite Company Inc.
Tokyo, JAPAN; (03)5400-3700
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399

TRANSMISSION, FACSIMILE

The Communications Authority of Thailand
Bangkok, THAILAND; (2)573-2828
Globe Telecom
Ermita Manila, PHILIPPINES; (2)521-3550
Hong Kong Telecom Private Network Service Management
HONG KONG; 883-3146
PT Citra Sari Makmur
Jakarta, INDONESIA; 21-570-6399

TRANSMISSION, FIBER OPTIC

Hong Kong Telecom Private Network Service Management
HONG KONG; 883-3146

TRANSMISSION, INTERNATIONAL

The Communications Authority of Thailand
Bangkok, THAILAND; (2)573-2828
Hong Kong Telecom Private Network Service Management
HONG KONG; 883-3146

TRANSMISSION, POINT-TO-MULTIPOINT

Compunet Corporation Ltd.
Sukhumvit 21 (Bangkok), THAILAND; (2)260-7306
Globe Telecom
Ermita Manila, PHILIPPINES; (2)521-3550

Hong Kong Telecom Private Network Service Management

HONG KONG; 883-3146

International Communications Corporation
Pasig (Metro Manila), PHILIPPINES;
(2)631-2447

TRANSMISSION, RADIO

Hong Kong Telecom Private Network Service Management

HONG KONG; 883-3146

Space Association of Australia
Mulgrave North, VIC AUSTRALIA;
(3)772-5804

TRANSMISSION, SCPC

Compunet Corporation Ltd.

Sukhumvit 21 (Bangkok), THAILAND;
(2)260-7306

Globe Telecom

Ermita Manila, PHILIPPINES; (2)521-3550

Hong Kong Telecom Private Network Service Management

HONG KONG; 883-3146

International Communications Corporation
Pasig (Metro Manila), PHILIPPINES;
(2)631-2447

PT Abhimata Citra Abadi

Jakarta, INDONESIA; 21-420-5441

Telekom Malaysia Berhad

Kuala Lumpur, MALAYSIA; (03)232-9494

TRANSMISSION, SPECIAL EVENT

Japan Business Television Inc.

Tokyo, JAPAN; (03)470-3080

TRANSMISSION, TELEPHONE

The Communications Authority of Thailand
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Ermita Manila, PHILIPPINES; (2)521-3550

Hong Kong Telecom Private Network Service Management

HONG KONG; 883-3146

TRANSMISSION, TELEVISION

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Satellite Television Asian Region Ltd. —
STAR TV

Hong Kong, HONG KONG; 532-1888

Telekom Malaysia Berhad

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Hong Kong Telecom Private Network Service Management

HONG KONG; 883-3146

TRANSMISSION, VIDEO

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International Communications Corporation
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(2)631-2447

Japan Communications Satellite Company Inc.

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TRW Overseas Inc.

Tokyo, JAPAN; (03)3234-8892

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Globe Telecom

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PT Abhimata Citra Abadi

Jakarta, INDONESIA; 21-420-5441

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Kungki-Do, KOREA; (343)50-7246

Karachi Scientific Society

Karachi, PAKISTAN; 714 501

Salim Mehmud

Sindh, PAKISTAN; (21)442 068

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TURNKEY SYSTEMS

ARIES Electronics Agencies Pvt Ltd.

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Awa Communications

Sydney, AUSTRALIA; (2)413-6333

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Beijing Asia Satellite Communications Technology Company Ltd.

Beijing, CHINA; (1)256-2573

Skydata Inc. — A Division of the Samsung Company

Seoul, KOREA; (02)751-2544-6

Spar Communications Group

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Al Tai Sat

Baghdad, IRAQ; 1-541-1277

Anriga Limited

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Ashin Corporation

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Azimuth (Far East) Ltd.

Beijing, CHINA; (1)436-1898

Beijing Asia Satellite Communications Technology Company Ltd.

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Best Systems Corporation

Taipei, TAIWAN; (2)218 6286

Bharat Electronics Ltd.

Bangalore, INDIA; 812-269-897;
812-267-322

Cad Cam Industries

Central District, HONG KONG; 524-2483

Channel Master

Bombay, INDIA; 387-9390; 388-7275

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Bombay, INDIA; 387-9390; 388-7275

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Comstar Company Ltd.

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25-2311

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86-2448

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Karachi Scientific Society
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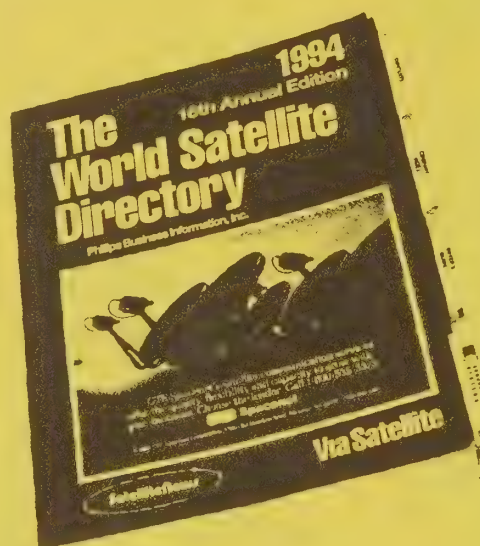
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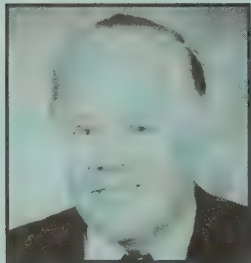
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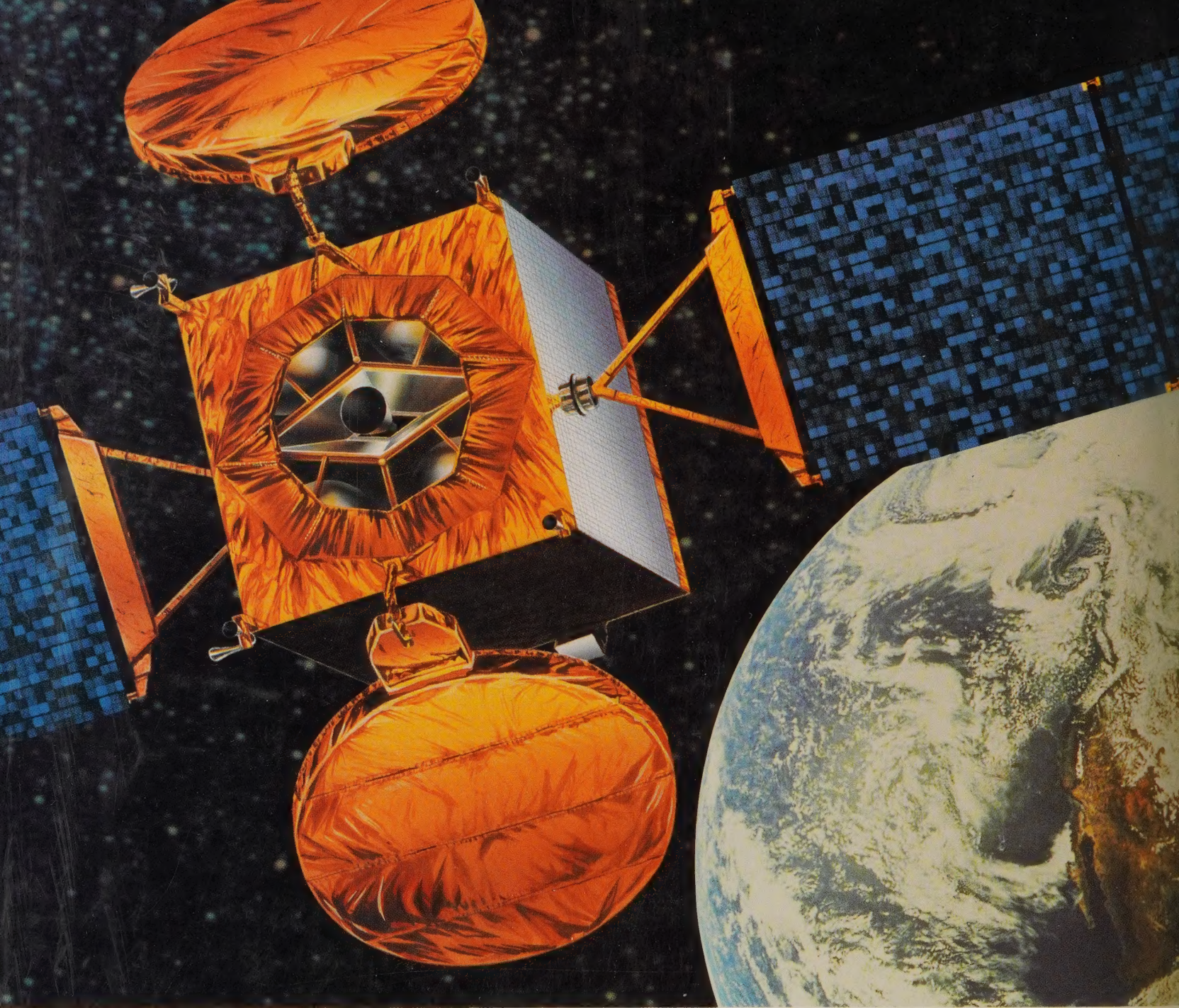
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